AUGUST 24, 1959

PAPER TRADE JOURNAL

HARDWOOD SEMI-CHEM . . .

Editor's original and exclusive article on the continuous pulping of birch at Sweden's giant Stora Kopparberg A. B.

ALSO . . .

Selection and Care of Stainless Steel

Manufacture and Use of Chlorine Dioxide

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SERVICE

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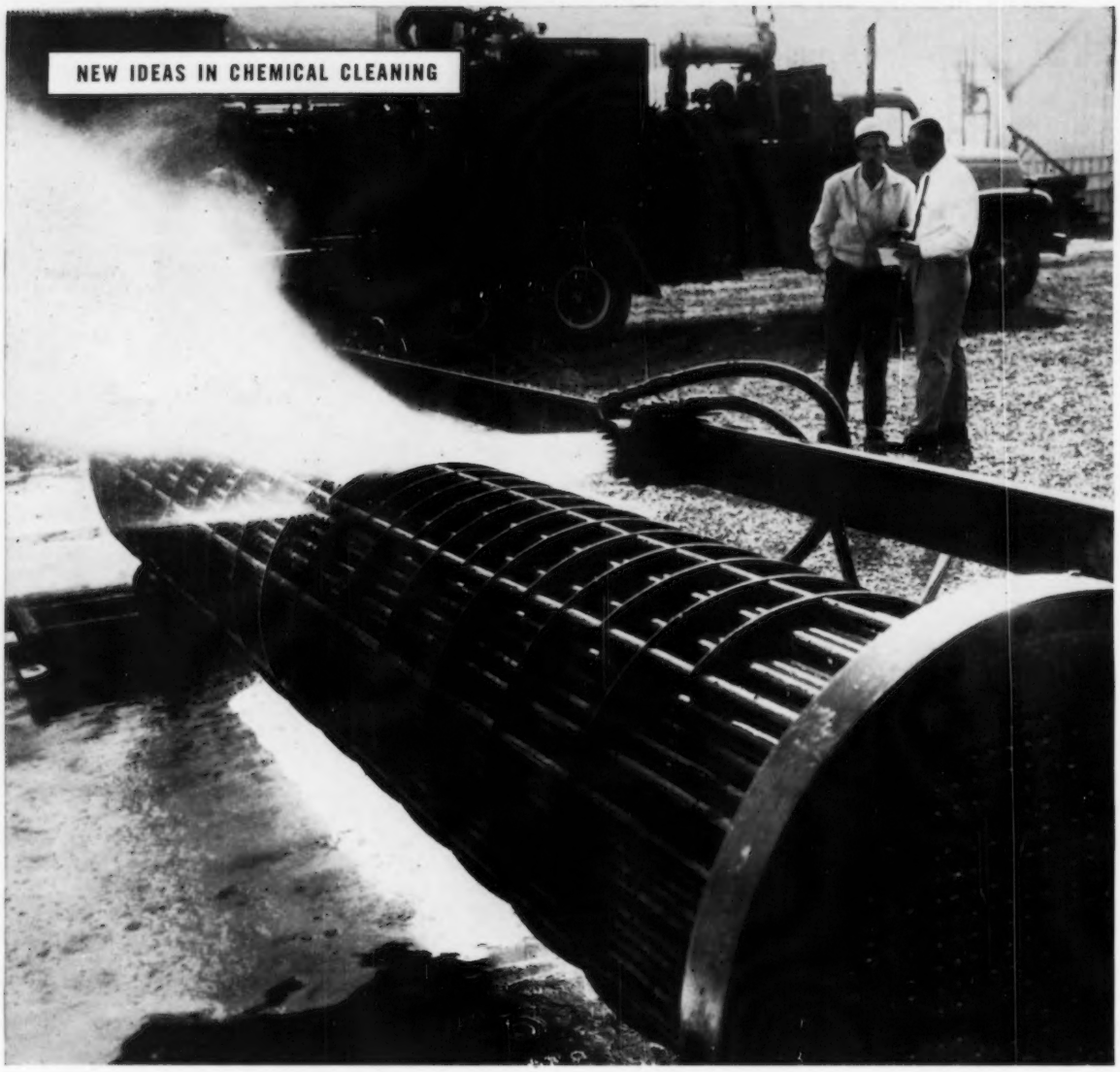


New Jetting Tool To Clean Tube Bundles Saves Thousands Of Dollars

The new high-pressure hydraulic tool, shown above, is currently saving thousands of dollars for companies in the refining, chemical, and petrochemical industries. It is the jetting tool developed by Dowell to remove deposits from heat exchanger tube bundles.

Previous methods of cleaning these bundles have been costly, time-consuming and often inadequate. Many times bundles had to be replaced completely because of the lack of a suitable cleaning method.

This new Dowell tool has a remarkable record of thorough, fast cleaning. For example, a slurry reboiler exchanger bundle, three feet in diameter and 16 feet long, was fouled with deposits of coke and asphalt. After being jetted from only one side, the bundle was thoroughly clean. Time required: less than one hour.

The tool holds the bundle in place for cleaning and has flanged rollers for rotation. The jet-head is manipulated automatically so that all tube spaces are covered. The jetted liquid can be either water or chemical solvents.

This high-velocity jetting device is another example of the new ideas Dowell continues to offer in chemical cleaning to help you cut your costs. Whatever the cleaning problem in your plant, call Dowell for an engineered recommendation. Dowell — the largest, the oldest, the most experienced chemical cleaning service — Tulsa 1, Oklahoma; and 165 stations and offices in major industrial centers.

Chemical cleaning service for all industry DOWELL

DIVISION OF THE DOW CHEMICAL COMPANY

What do you see in this quiet picture?

❶ **Is it a "still" ( ) or an action photo? ( )**

❷ **Are the men working?**
Yes ( ) No ( )

❸ **Which is the parent roll?**
Left ( ) or Right ( )

❹ **See any movement? Look closely!**
Yes ( ) No ( )

❺ **Machine-day is 8 hrs ( )**
12 hrs ( ) 24 hrs ( )

❶ The papermaking process doesn't stop for candid photographs. If you checked "action" you're right. The winder has just started a new run. In a few seconds the winding speed will be well over a mile a minute.

❷ That three-man crew is working! Their watchful attitude tells you that the winding operation is completely automatic. Every 8 minutes the crew unloads (automatically) and starts a new 7,000 lb. roll. They're watching the slitter units, web tension, and winder speed, and are ready when necessary to make instant automatic adjustments at the control panels.

TEST YOUR POWERS OF OBSERVATION

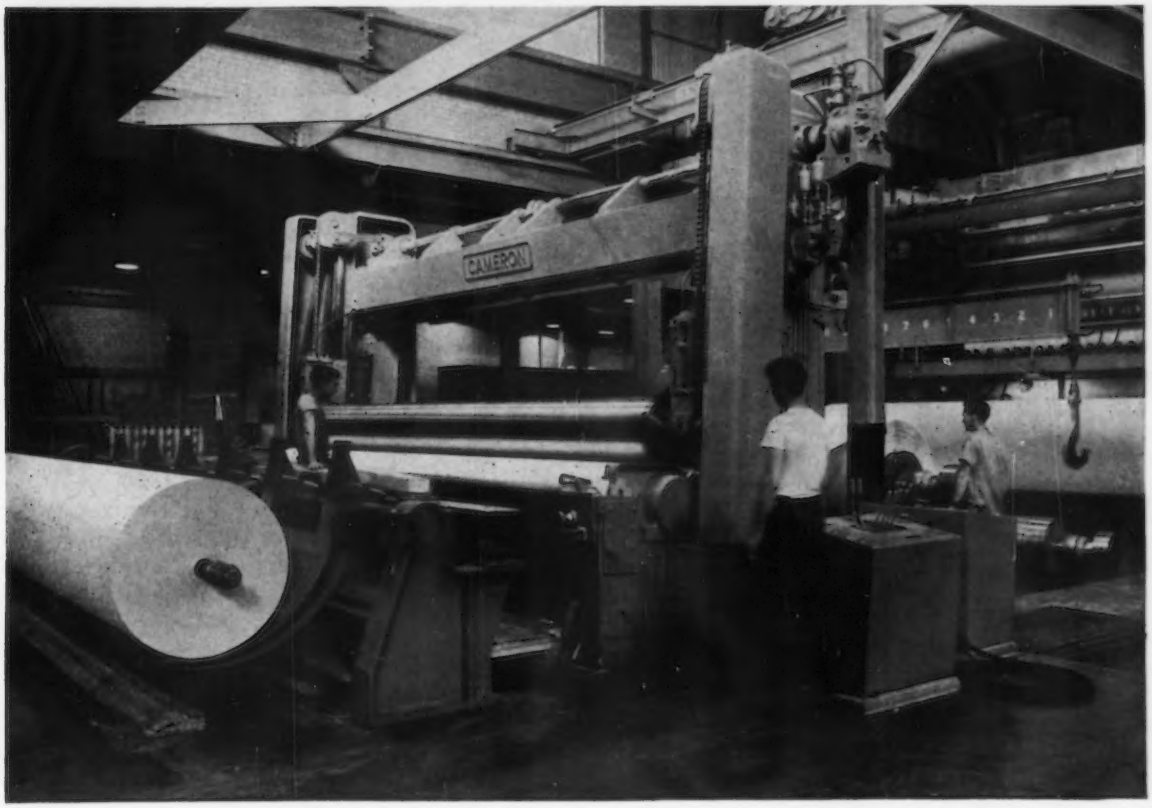
The unretouched candid photograph reproduced below was made at Southland Paper Mills, Lufkin, Texas by a UPI photographer. What you see in it depends on how well you know your winders. Read the questions, then check your answers in the numbered paragraphs.

❸ The parent roll is at the right. You can recognize it by the rough telescoping of its side. The finished roll at the left was unloaded seconds ago. You can tell by the exceptionally smooth, flat side *(unretouched)* that it is a perfect roll, uniformly wound from core to circumference. Cameron Imperial Winders are built to produce perfect rolls every time, automatically.

❹ You probably saw the slight blur as the control operator moved his left hand. The winder is sharp in every detail because there is no vibration. Performance is just as quiet as it looks, even at top speeds with a full payload. The dynamic thrust of almost three tons of paper winding at well over a mile a minute is tamed by the perfect balance, fine engineering, skilled craftsmanship and rugged construction of the winder.

❺ Twenty-four hours is "right" in every busy paper mill. The only change is in the crews. Cameron Imperial Winders are built to stay on the job 24 hours a day at speeds well ahead of the peak requirements of any mill.

THE NAME at the top of the machine tells you it's the fastest winder in the world—the Cameron Imperial—now available with speeds up to 8,000 fpm on newsprint, rewind diameters up to 72", pneumatic score-cut or shear-cut slitting, and automatic controls. If you are interested in fast, low-cost production of better newsprint, paper or paperboard rolls, why not consult with the Cameron Team of Specialists?



AA-365

Cameron Machine Company, Franklin Road, Dover, N. J.
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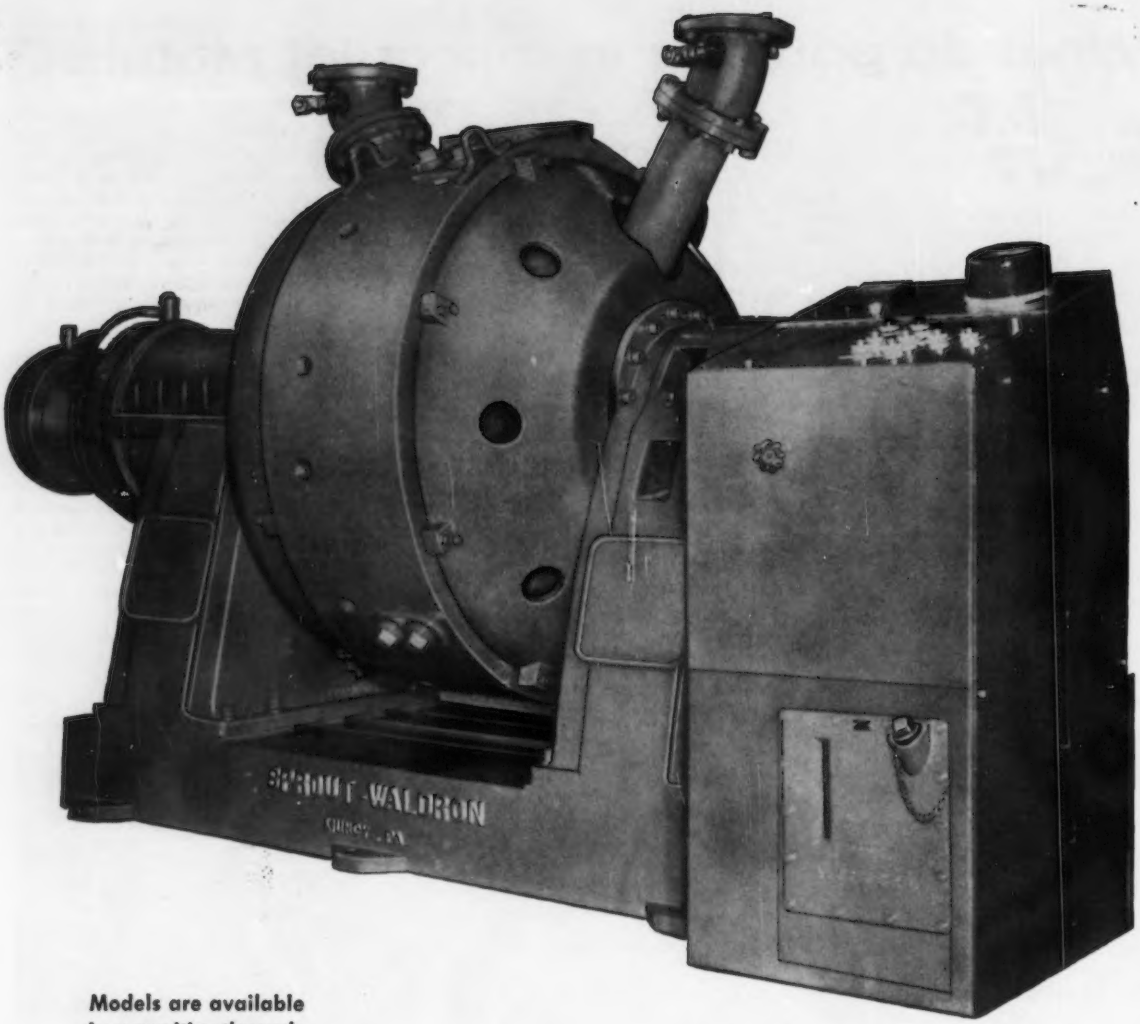
CAMERON
a team of specialists

53 years devoted exclusively to the design and manufacture of slitting, roll winding, unwind and web control equipment.



Models are available in capacities through 1200 horsepower

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Write for Advance Specification Sheet No. 210

This new type stock preparation pressurized refiner is designed to produce highest quality pulp to exacting specifications. Unique parallel flow feed arrangement and self-balancing thrust assure high capacity with low operating and maintenance costs. The refining mechanism consists of a floating rotor-shaft assembly rotating between a fixed and hydraulically controlled movable head. A set of refining plates is mounted on each face of the rotor as well as on the two stationary heads. Major advantages are: mechanical simplicity; installation versatility; high production quality; simple maintenance; high production.

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REMEMBER THESE DATES

September 9-11. TAPPI Fundamental Research Conference, Institute of Paper Chemistry, Appleton, Wis.

September 13-16. National Paper Trade Ass'n. Fall Meeting, Conrad Hilton Hotel, Chicago, Ill.

September 15-17. 9th TAPPI Corrugated Containers Conference, Jung Hotel, New Orleans, La.

September 21-23. Paper-Plastics Conference, Edgewater Beach Hotel, Chicago, Ill.

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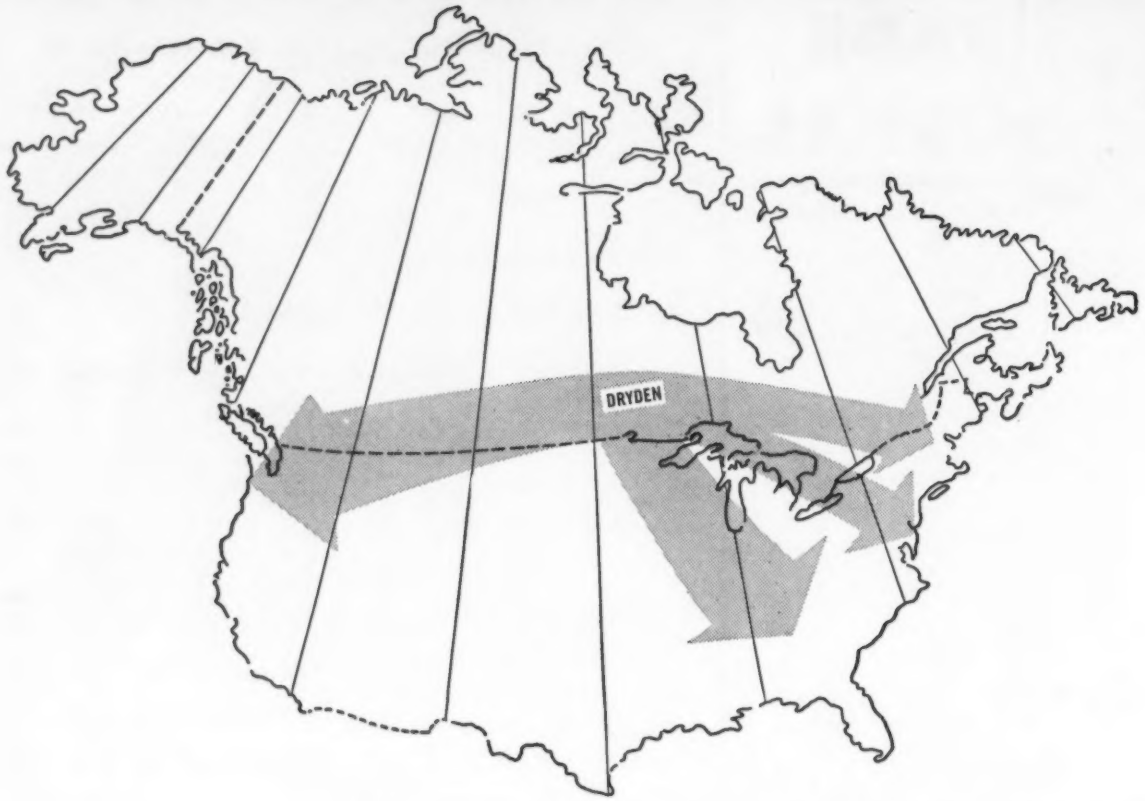

Dryden has long been known for its efficient Traffic Department...always ready to ship on a few hours' notice. And the shipments get to our customers in record time, because of Dryden's strategic location and proximity to major rail, highway and water routes.

A glance at the map makes it obvious why Dryden can and does make 4-6 day deliveries to the Midwest. But did you know that we also can give the same kind of service to our customers in Eastern United States and Canada? Dryden maintains inventories in boxcars, ready to go at a moment's notice.

Ask your laboratory to compare Dryden Bleached Sulphate with the best quality pulp you know. You, too, will say that it deserves all the endorsements—*and production testimonials*—it now enjoys. Order a trial shipment today. You will be amazed at how quickly you receive it.

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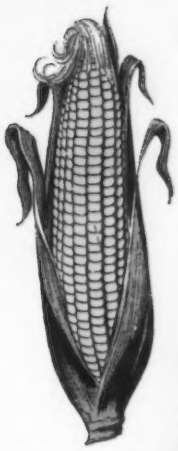
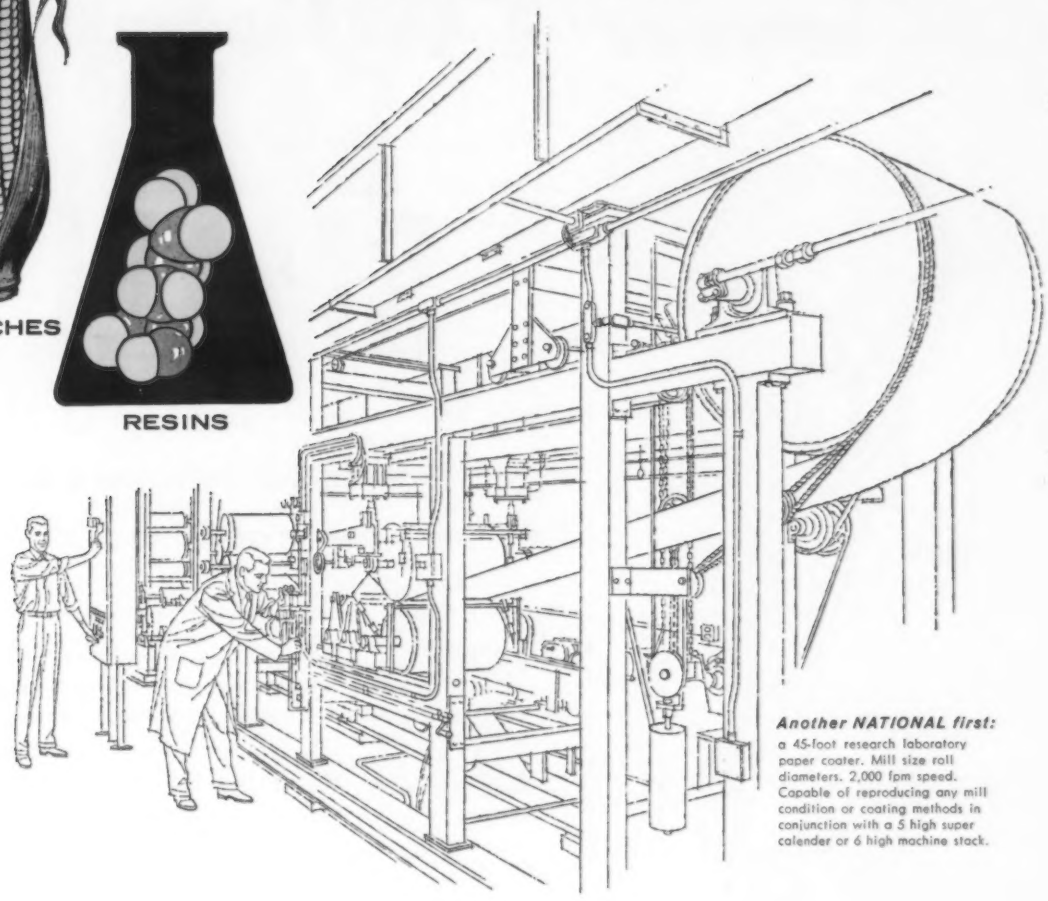
GENETICS + SYNTHETICS + ADVANCED THINKING



STARCHES

RESINS



Another NATIONAL first: a 45-foot research laboratory paper coater. Mill size roll diameters. 2,000 fpm speed. Capable of reproducing any mill condition or coating methods in conjunction with a 5 high super calender or 6 high machine stack.

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The genetic "cross pollination" of hybrid corn to produce unique strains . . . and the chemical "cross pollination" of corn starch to produce unique starch derivatives . . . plus "cross pollination" with vinyl acetate polymers and copolymers in emulsion form . . . have given NATIONAL complete flexibility of formulation in creating new and unique starch and resin coatings for paper. That's one great advantage.

An even greater customer advantage is NATIONAL's unmatched technical service. It's based on the "cross pollination" of our advanced thinking in paper coating research and our broad technical field experience.

Isn't it obvious that NATIONAL, who leads in research and serves the entire paper industry, can offer a wealth of know-how not generally possessed by individual paper companies?

This unmatched "cross pollinated" technical service is available for the asking . . . to help build unique product features that become decided competitive advantages.

You'll find our coating binders and adhesives—everywhere!

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is your PROCESS FLOW SMALL?

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Whether your process flow is a trickle or a torrent, there's a Honeywell automatic control valve to meet your requirements. The Honeywell valve illustrated—Series 800, Type 14 Low Flow—is designed to control small process flows. For each body size, there are interchangeable reduced plug and seat ring combinations . . . with flow coefficients ranging from Cv 0.33 to 8.2. Ultra-low flow plugs are available with Cv's as small as 0.01.

For small or large flows . . . or other process flow conditions . . . Honeywell valves are available in a variety of types and sizes. When you need control valves . . . contact your local Honeywell field engineer. Write for new Catalog C800-1.

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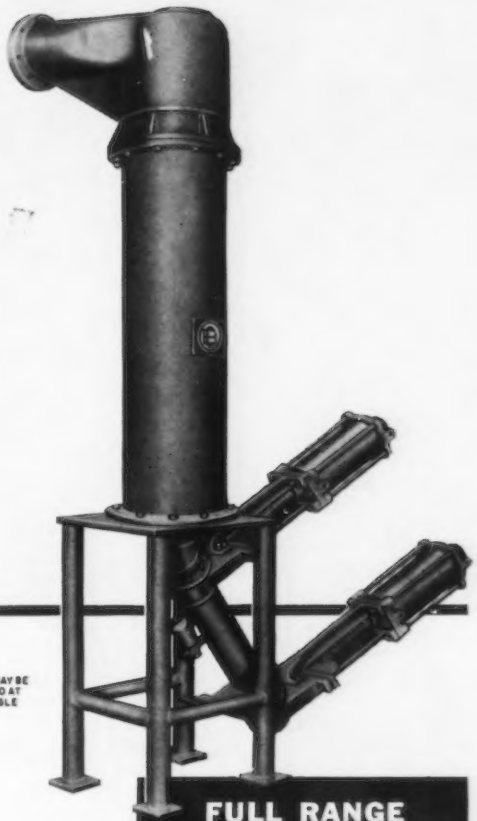
Just 1 Black-Clawson LIQUID CYCLONE Cleans 50 Tons of Filler Stock Per Day in 7 sq. ft. of Floor Space

New Ceramic Liner Assures Longer Life

This new free vortex type high velocity separator removes dirt, grit and other rejects from slushed paper stock without plugging. It has been proved highly efficient as a primary cleaner following the Hydrapulper, ahead of machine screens on Fourdrinier and cylinder machines or on cylinder vats where screens aren't used.

- Non-plugging features assure continuous operation.
- Extra long life with new, exclusive "Cyram" (special ceramic) liners.
- Compact, saves space, needs no supporting members.
- Manual or automatic reject system.
- Both low and high pressure units available.

Additional specifications and operating data are available at our Shartle Division. May we send it to you?



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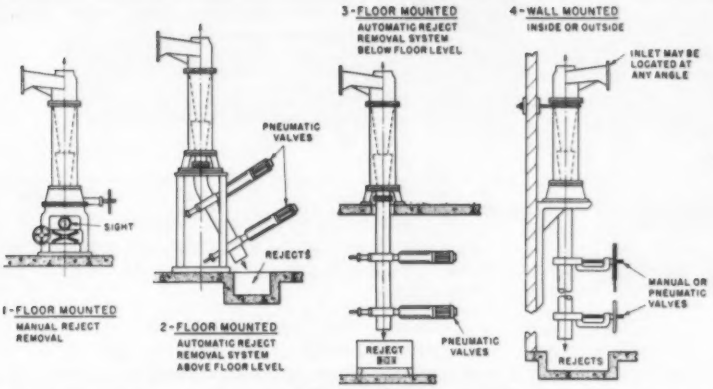

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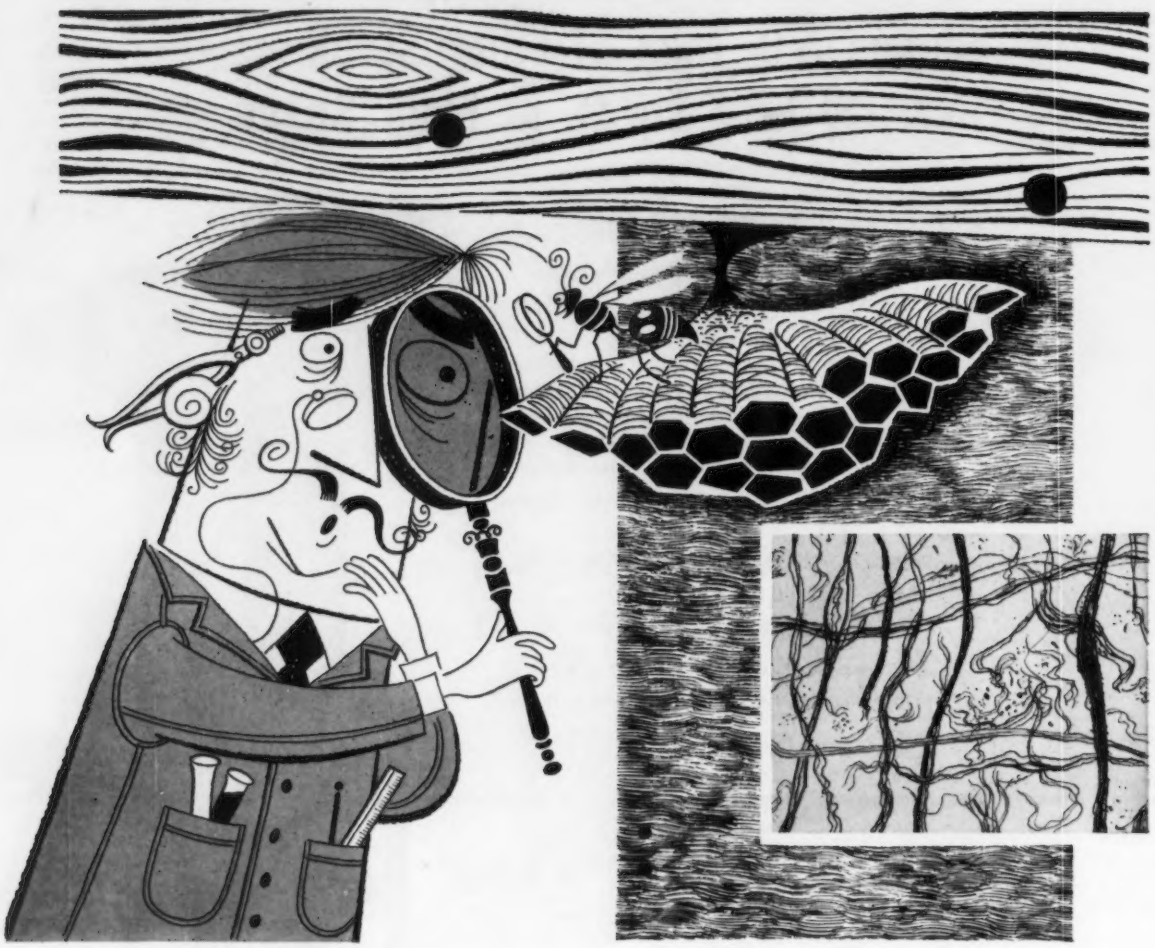
Tales of the Paper Industry: No. 1



How a wasp inspired the idea of using wood to make paper

One day, while closely observing a wasp hard at work on a nest, René Antoine Ferchault de Réaumur, the French naturalist and physicist, decided that the wood filaments used by these insects in nest building could also be used in the process of paper making. Although, Réaumur never tested his theory, he remains the first scientist to suggest that paper could be made from wood fibers.

Here, the observations of one man eventually paid off in revolutionary progress for the paper industry. The moral of the story: *the opinion of a qualified person is often invaluable.* So, if you're planning on buying pipe or tubing for paper mill applications, National Tube's trained Mill Service Force may be able to offer you some money-saving advice.

Our technicians will gladly make a careful study of your requirements, and then recommend the best, most economical pipe for the job. These men are also available for field consultation. And, their advice won't cost you a thing.

National Tube manufactures seamless pipe and tubes in a complete range of steel analyses from low carbon through the alloys up to and including stainless steel. A wide variety of sizes and wall thicknesses is available for every mechanical and pressure requirement. Plan now to contact National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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METASOL performance report from Eastern's Lincoln Mill

"METASOL helped us lick a serious slime problem"

"Quality control is an important phase of our operations" states Bob Johnson, Assistant Paper Mill Superintendent of the Lincoln, Maine Mill of Eastern Fine Paper and Pulp Division, Standard Packaging Corporation. "That's why we're constantly on the look-out for new and better ways of doing things. For instance, one of our big problems has been the control of microbiological slime. Six months ago, slime had become a very serious problem at this mill. None of the conventional slimicides seemed to work successfully. Then we tried METASOL in our Number 5 machine. The results were so spectacular that a month later we began using it on our Number 4 machine. In fact, we're now able to run six weeks before a boil out as opposed to two or three weeks before using METASOL. In fact, our process control supervisor informs me that bacteriological slime spots have now virtually disappeared in our end product."

Proved by Tests

These observations—made by men who face these problems daily—provide a striking testimonial to the effectiveness of METASOL as an agent for controlling microbiological slime. Further substantiation was found in actual plate counts taken during the initial comparison tests. These showed that over the same period the organism count had been reduced 50% in METASOL-treated machines, whereas, the count had tripled in machines using the conventional slimicide.

What METASOL is

METASOL is a completely new type of slimicide which has demonstrated superiority in its "quick kill" and "sustained kill" action against bacteria, fungi and other microorganisms. It is odorless and colorless and has highest solubility in water.

In tests in leading mills, METASOL has proved superior to any other slimicide on the market. Every mill that has tried it, has decided to use it on a continuing basis.

Keeps machines running longer

METASOL lowers production costs because it keeps machines clean and helps them deliver a finer product without loss of time. In many cases periods between boil-outs can be extended three to four times.

Solid or liquid

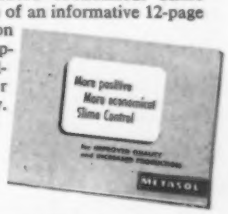
METASOL has the highest and fastest solubility in water. It is available in dry (METASOL-P) or liquid (METASOL-L) form to suit your convenience.

Demonstration in your mill

METASOL chemists and micro-biologists will demonstrate its effectiveness in your mill, on your machines under normal production conditions. On request, they will analyze your particular slime problem, recommend corrective measures, and train members of your own organization in efficient slime control methods.

Write for information

"More positive, more economical Slime Control" is the title of an informative 12-page technical brochure on METASOL, its use, application and development. Send for your free copy today.



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No other chlorination cell combines these advantages:

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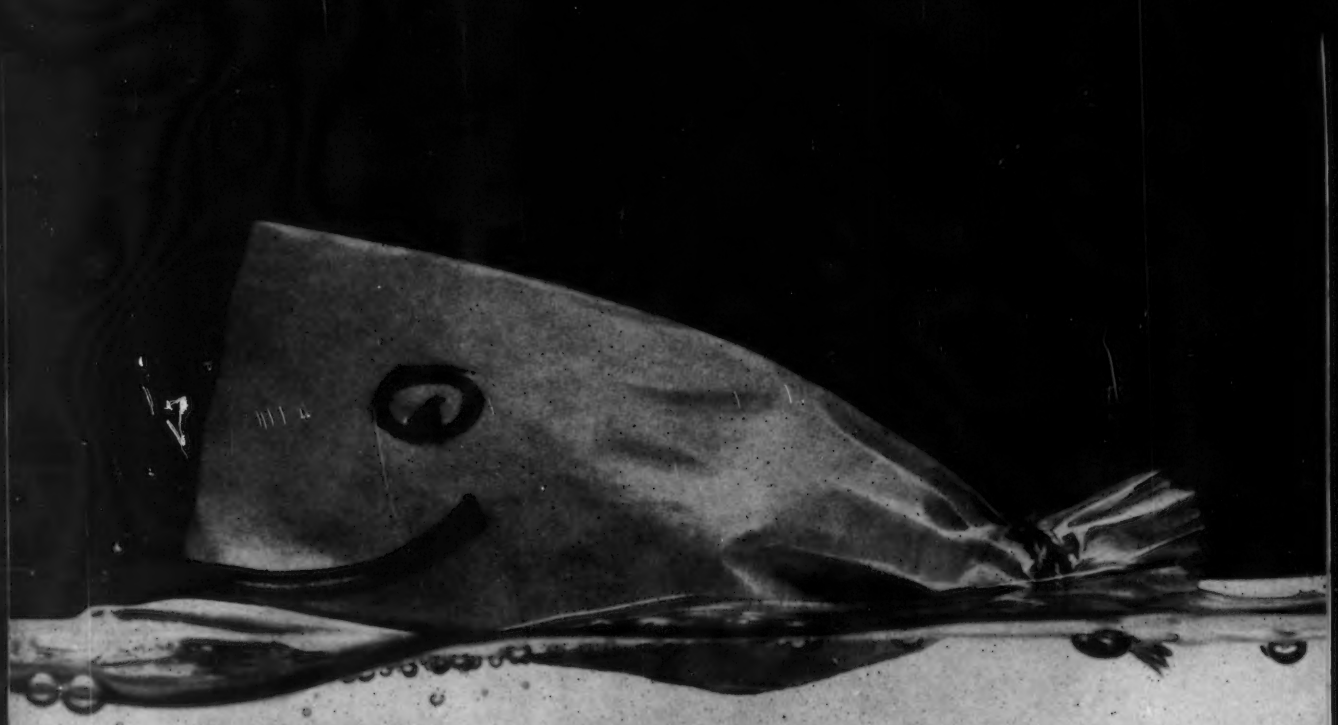
3. Lowers routine maintenance.
4. Reduces down time of automatic control system.
5. Eliminates bridging between electrodes by fibers.
6. Eliminates need for diluting stock or for separate sampling line.

The skill of the Diamond technicians who developed this chlorination cell, the facilities of the Diamond Pulp and Paper Laboratory and thirty years of manufacturing and shipping experience of the world's largest makers of CHLORINE and CAUSTIC SODA make Diamond your logical supplier for CHLORINE and CAUSTIC SODA. Call your nearby Diamond Sales Office or write . . . DIAMOND ALKALI COMPANY, 300 Union Commerce Bldg., Cleveland 14, Ohio.

Diamond Chemicals



this paper was treated with

SCRIPTITE* 33

A melamine resin supplied as a finely divided dry powder, Scriptite 33 imparts high wet strength to many paper products. Count on Scriptite 33 to increase dry tensile strength and wet rub resistance . . . to improve dry Mullen, wax pick, internal size efficiency, and dry stiffness. Scriptite 33 produces papers with strong fold endurance. For laboratory samples of Scriptite 33 and technical bulletin, write Monsanto Chemical Company, Plastics Division, Room 1068, Springfield 2, Mass.

Monsanto

*SCRIPTITE: Reg. U.S. Pat. Off.

The Monsanto line of paper resins also includes

SCRIPTITE 40 . . . *a urea type wet-strength resin.*

SCRIPTITE 50 . . . *for unsurpassed printability and improved surface characteristics on boxboard.*

SCRIPTITE 52 . . . *in combination with formaldehyde to give water resistance to folding boxboard and to jute liner.*

SCRIPTITE 54 . . . *for outstanding water resistance and both wet and dry rub resistance.*

INSTALL PERFORMANCE NOT PROMISES

Promised catalog ratings and actual on the job ratings are not always the same. When you install "Buffalo" Fans you can always be sure that fan *performance* will confirm your good judgment. Buffalo Forge Company's 81 year reputation for highest engineering and manufacturing standards is assurance that you will obtain fan performance to meet the *exact* requirements of each job.

FOR HIGH PRESSURE REQUIREMENTS:

Designed especially for Class III and IV construction, the "Buffalo" Type "BLH" fan will provide peak performance for your high pressure systems. It affords a high mechanical efficiency over a wide range, while maintaining stability of performance from free delivery to shutoff. The "BLH" features a smooth inlet bell, directional inlet vanes, backward-curved blades and divergent outlet. These factors reduce turbulence to a minimum, and give very quiet operation. An added feature is the non-overloading characteristic. Bulletin F-201 gives complete details.

FOR MODERATE PRESSURE REQUIREMENTS:

The "Buffalo" Type "BL" Fan is an ideal choice for your Class I and II ventilating and air conditioning installations. Its high static efficiency over a broad range has been proved in hundreds of applications. The "BL" has many of the unique "Buffalo" features of the "BLH": it is non-overloading, and is designed for minimum turbulence and ultra-quiet operation. Other features are the factory-balanced wheel to minimize vibration and the wheel-contoured housing with large, correctly-shaped scroll. Write for Bulletin F-104.

Only "Buffalo" offers you the "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

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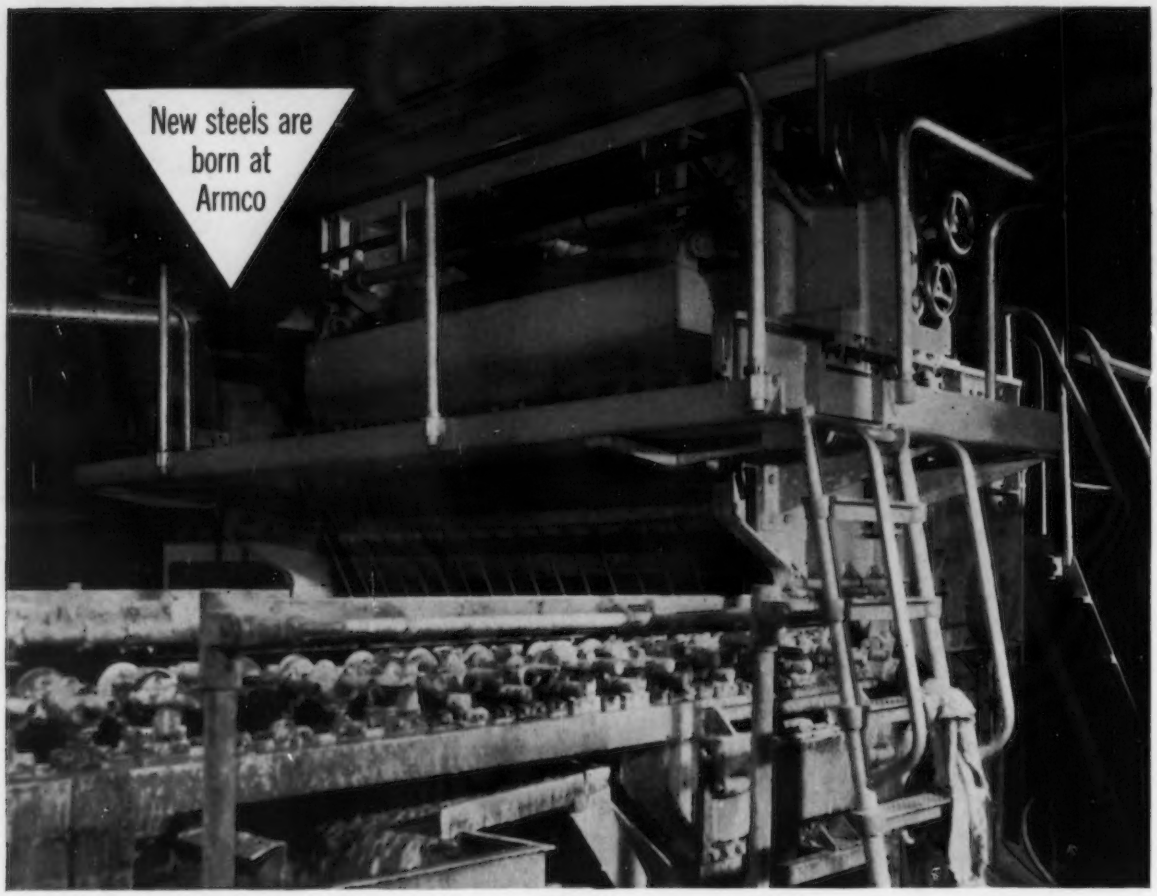
SCRIPTITE 54... *for outstanding water resistance and both wet and dry rub resistance.*



A lining of Type 316 L stainless steel in this pressure-type head box insures against rust contamination of stock. Stainless front plate and slice can be seen beneath catwalk.

Type 316 L Stainless Steel Head Box Lining at Sorg Paper Company Keeps Stock Clean

The 117" pressure-type head box on the wet end of the new No. 4 paper machine at The Sorg Paper Company is completely lined with Type 316 L (Armco 18-12 Mo ELC) stainless steel. Front plate and slice are also made of this special steel.

"With Type 316 L stainless steel, we don't have to worry about the stock becoming contaminated with rust," states a company engineer. "Besides, stainless is easy to clean and stays clean longer."

Modern paper mills are specifying more and more stainless steel to eliminate corrosion problems and reduce maintenance. In addition, stainless usually increases the service life of equipment, cuts down on costly replacements.

Armco produces most standard grades and many special grades of stainless steel in sheet, strip, bar, wire, and billets. For a copy of Armco's stainless steel catalog, see your nearby Armco Distributor or write Armco Steel Corporation, 3049 Curtis Street, Middletown, Ohio.

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His greater adhesive strength, better water holding properties, and correct ink receptivity assure better printing on low basis weight coated papers.

Penick and Ford's Technical Sales Service and Field Development Department is constantly finding new ways to improve the quality of paper. If your problem concerns lightening your paper, we will be glad to help you. Why not call us—today.

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Leaders in Epoxy Starches

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trims costs and paces production at

Clark-Aiken Roll Stand, Type D Cutter
and Overhanging Piler boosts production while
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United States Envelope Company, Metuchen, New Jersey.
Cutter and Piler handle sheets up to 64 inches wide.

CLARK-AIKEN EQUIPMENT - GEARED TO MODERN FINISHING ROOM REQUIREMENTS FOR FAST, PRACTICAL AUTOMATION THAT MEANS GREATER ACCURACY, BETTER QUALITY AND HIGHER PROFITS...

It's axiomatic in industry that profits depend on production. This axiom takes on even greater significance in the modern finishing room where the key to top production lies in the new concept of practical automation—engineered by Clark-Aiken to fit your specific needs. Progressive management turns more and more to the trained experts at Clark-Aiken for the solution to production problems.

An acknowledged leader in the manufacture of paper mill machinery for more than a century, Clark-Aiken now shows the way in the development of automated, custom-built machinery for greater accuracy, faster, more efficient materials handling and increased production.

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Whatever your finishing room production problem —consult Clark-Aiken for qualified and interested attention.

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with Albany Felt chemical treatments and synthetics . . .

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TWO DIRECTIONS

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POROSITY — **STRENGTH**

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At last, the ideal balance between *strength* and *drainage* in felt design can be obtained. With Albany's patented synthetic content design, greater resistance to abrasion is provided *and* Albany's special chemical treatments reduce the natural tendency of the synthetic yarns to be non-absorbent. Thus, two opposite aims can be reached simultaneously.

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If you have not received your copy of Albany's newest technical handbook "Improved Felt Performance" write for it today.

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MAIN OFFICE AND PLANT, ALBANY, N. Y.

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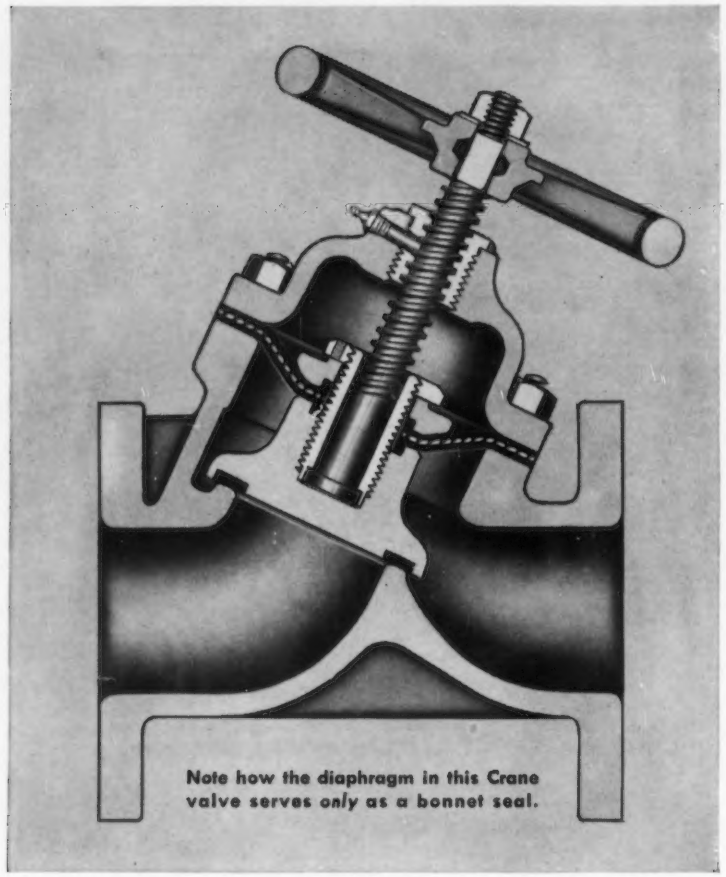
NEW IDEAS FOR BETTER PAPERMAKING— FROM THE WORLD'S LARGEST MANUFACTURER OF PAPER MACHINE FELTS



Note how the diaphragm in this Crane valve serves *only* as a bonnet seal.

Crane screwed-end diaphragm valve: ½" to 2". Flanged ends: ½" to 14". Four body materials; five trims. Special body and trim materials available on order.

Lined valves—flanged ends only. Neoprene and hard, natural rubber linings regularly available. Other linings on special order.

Crane separates disc and diaphragm to make diaphragm valves last longer

NOW IN SIZES UP TO 14 IN.

The diaphragm in ordinary valves is stretched to serve as a disc as well as a bonnet seal. This makes it vulnerable to crushing, cutting and abrasion. Result: accelerated wear . . . threat of rupture . . . frequent diaphragm replacement.

Not so with Crane diaphragm valves. The diaphragm has only *one* function: sealing the bonnet against line fluids. Result: diaphragm lasts longer—there's less valve maintenance cost. The disc is a *separate unit* and shuts off flow even if the diaphragm should fail.

Typical added Crane features

Y-pattern body offers least resistance to flow, minimizes pressure drop . . . *flat-faced disc* with durable, resilient insert ring resists erosion; seats tightly . . . valve operation requires lower torque; fewer turns.

Handle all types of fluids

Crane diaphragm valves are available for a wide variety of services—from water, air and gas to corrosive, volatile and hard-to-hold liquids. They are supplied regularly with bronze, cast iron, aluminum or stainless steel body—with neoprene, buna N, natural rubber, Kel-F or Teflon trim. Neoprene or hard, natural rubber lined valves also supplied. Other body materials, trims and linings on special order.

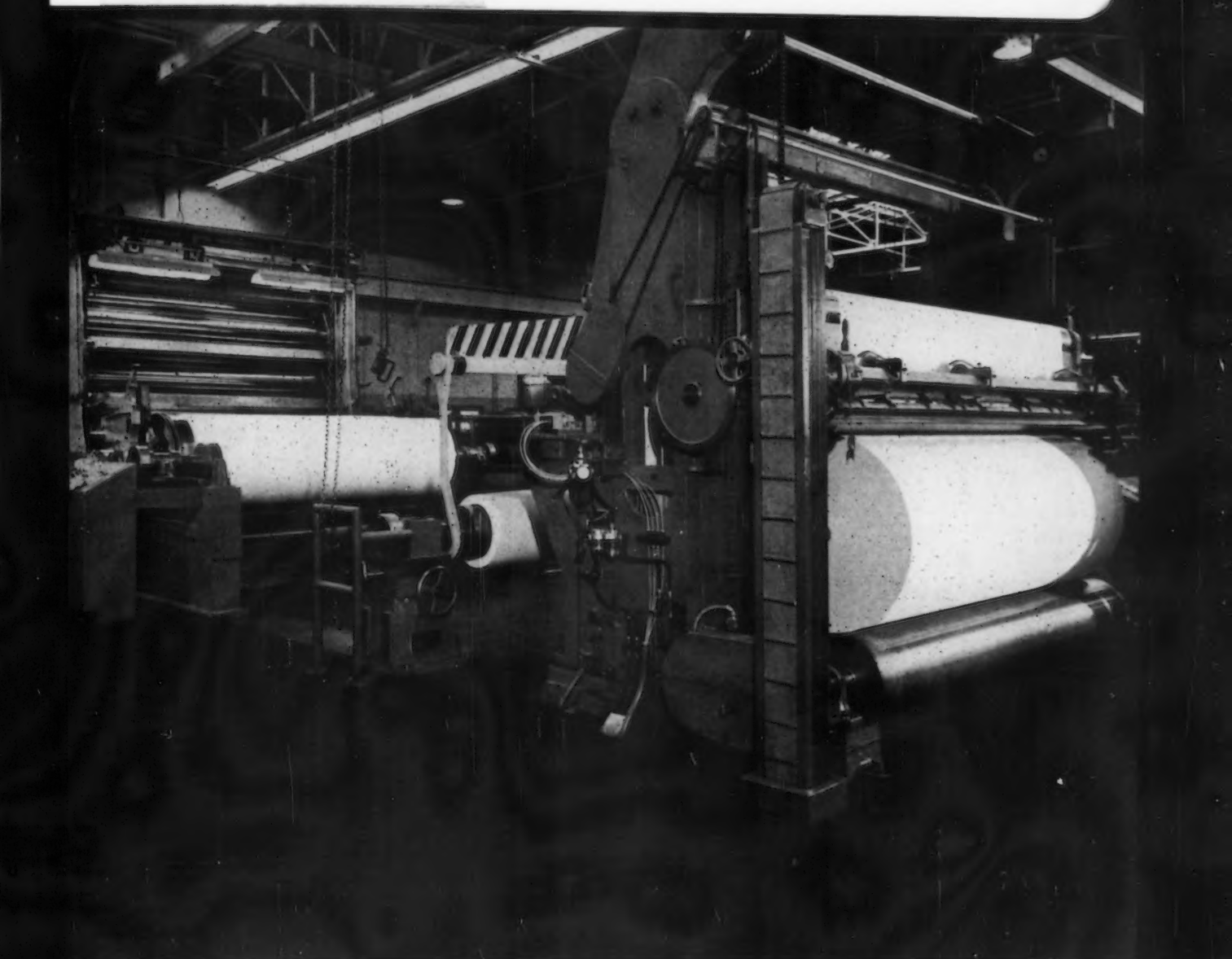
For complete details, consult your Crane Representative or write to address below for bulletin.

Ask for new Bulletin AD-1942

CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas



Mill Modernizes...Eliminates Rewinding... Saves Time and Trouble

Extensive modernization by the Nekoosa-Edwards Paper Company includes the Kidder 110-inch Superspeed Mill Winder shown above — an important new installation at the Nekoosa plant.

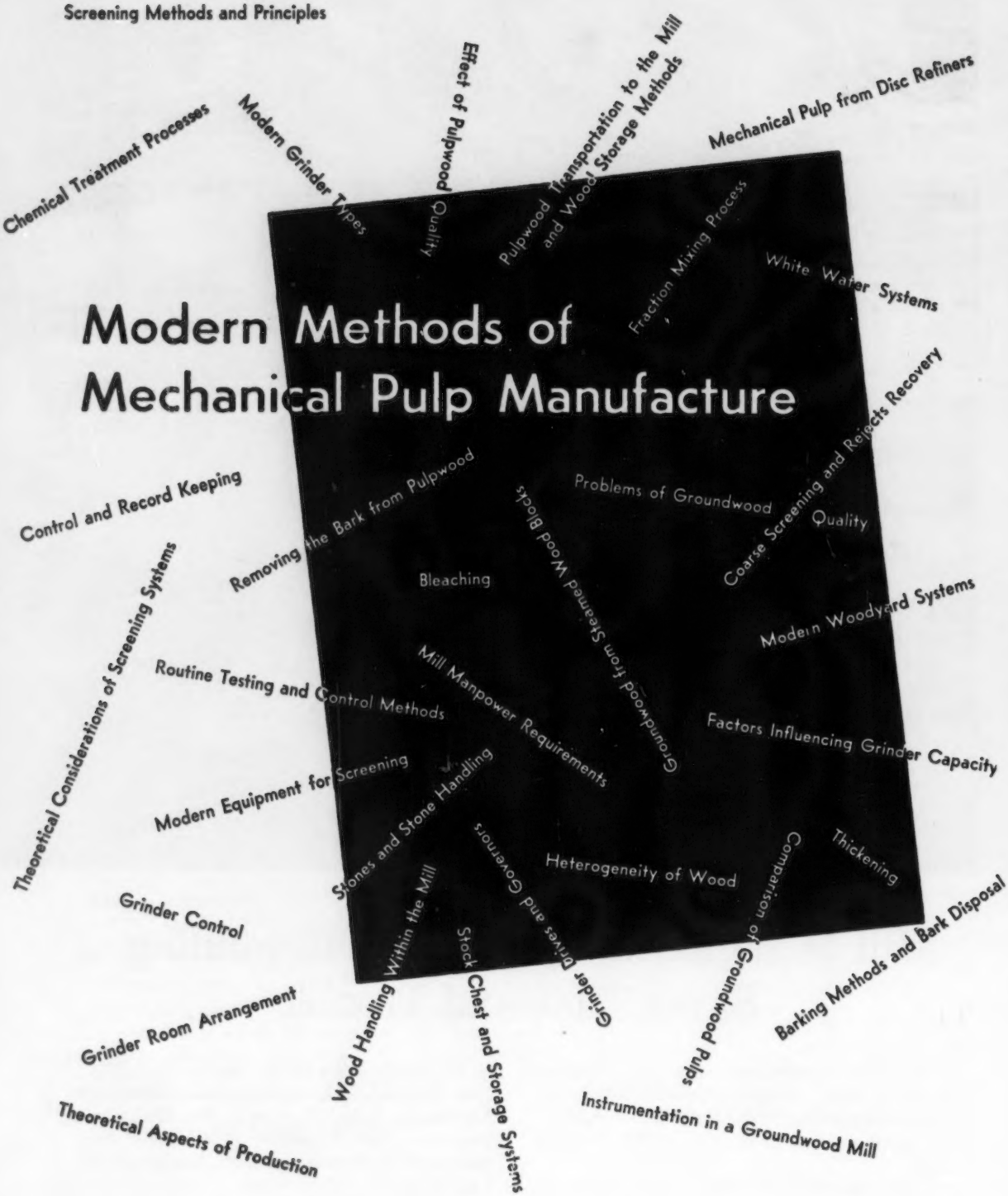
In one operation this machine slits and winds rolls up to 60″ in diameter . . . operates at 3000 feet per minute . . . has a multiple disc, water-cooled unwind brake and automatic, pneumatic tension control.

Advantages like these will help you meet today's requirements for paper machine efficiency speed and cut your finishing room costs. For details write to Kidder Press Company, Inc., Dover, N. H. Eastern Sales Office: Empire State Bldg., New York 1, N. Y. Midwest Sales Office: 400 Washington Bldg., Madison 3, Wis. West Coast Representative: Bojanower Machinery Service Corp., 5270 E. Washington Blvd., Los Angeles 22, California.

Make Good Impressions Faster with

Kidder

Slitters and Rewinders, Flexoprinter®, Letterpress and Gravure Presses


Screening Methods and Principles
Chemical Treatment Processes
Modern Grinder Types
Effect of Pulpwood Quality
Pulpwood Transportation to the Mill and Wood Storage Methods
Mechanical Pulp from Disc Refiners
Modern Methods of Mechanical Pulp Manufacture
Fraction Mixing Process
White Water Systems
Control and Record Keeping
Removing the Bark from Pulpwood
Problems of Groundwood
Coarse Screening and Rejects Recovery
Quality
Bleaching
Groundwood from Steamed Wood Blocks
Modern Woodyard Systems
Theoretical Considerations of Screening Systems
Routine Testing and Control Methods
Mill Manpower Requirements
Factors Influencing Grinder Capacity
Modern Equipment for Screening
Stones and Stone Handling
Thickening
Heterogeneity of Wood
Comparison of Groundwood Pulps
Grinder Control
Wood Handling Within the Mill
Stock Chest and Storage Systems
Grinder Drives and Governors
Barking Methods and Bark Disposal
Grinder Room Arrangement
Theoretical Aspects of Production
Instrumentation in a Groundwood Mill
Economic Importance, Main Properties, and Uses of Groundwood

. . . written by K. H. Klemm, this new book in 241 pages comprehensively covers all aspects of groundwood pulp production. Price: $5.00 from Lockwood Trade Journal Company, 49 West 45th Street, New York 36, New York

One of the important marketing functions of a waxed paper wrapper is to help the supermarket shopper identify her favorite brand.

TITANOX® helps her find her brand

Such identification is made easier by sharpening the contrast and legibility of the wrapper through white pigmentation. And the best effects are always achieved by the remarkable whitening, brightening and opacifying power of TITANOX white titanium dioxide pigments.

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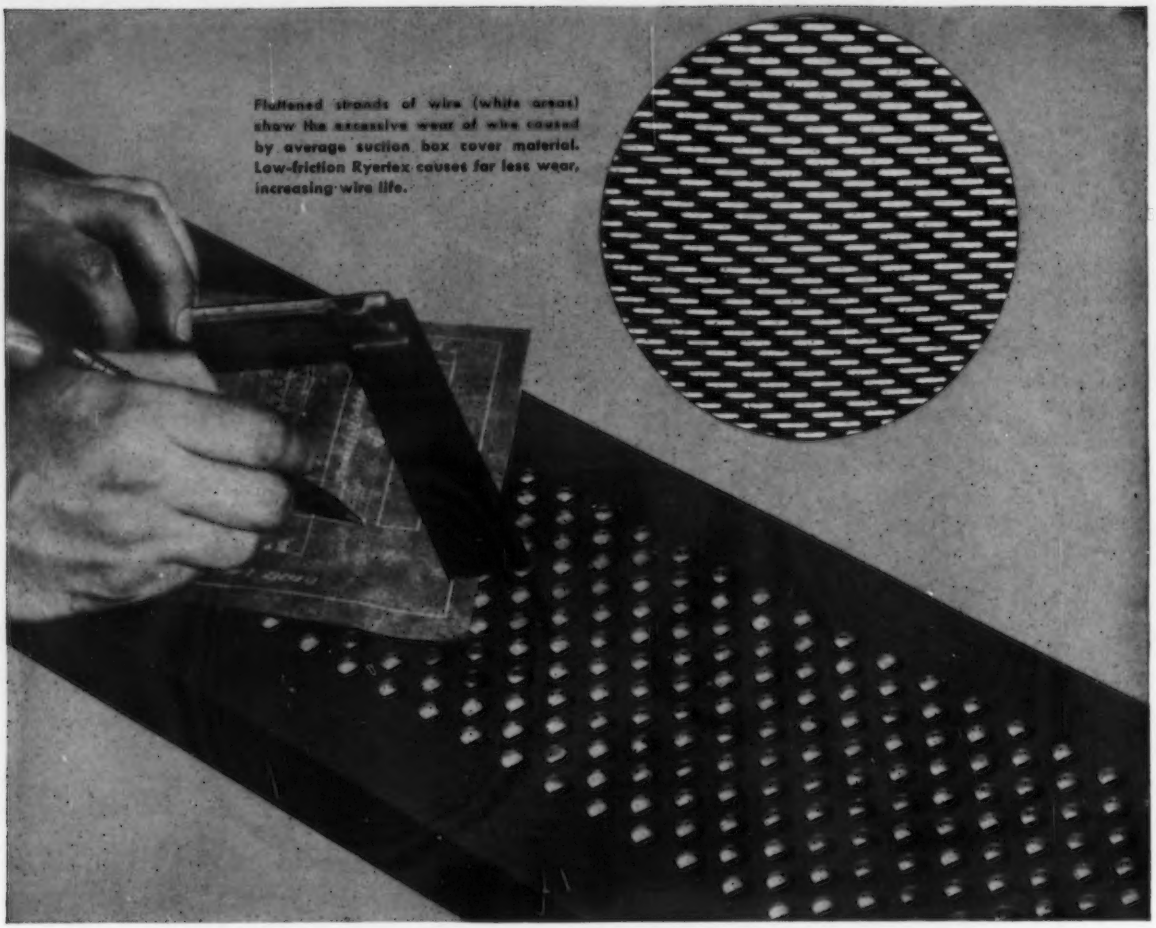
Flattened strands of wire (white areas) show the excessive wear of wire caused by average suction box cover material. Low-friction Ryertex causes far less wear, increasing wire life.

GET 25% MORE WIRE LIFE

Use Ryertex® suction box covers

At your wire's only point of drag—the suction box—you can reduce wire wear substantially by the use of job-proven Ryertex.

No other cover material has a lower coefficient of friction with water lubrication—less than 0.01, or about half that of wood covers under normal operating conditions. Wires slip so smoothly over Ryertex that their service life is increased as much as 25%—four wires doing the work of five. This means important wire savings.

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Because even the largest covers are made of one continuous piece of Ryertex, they may have any perforation pattern of holes or slots, straight or tapered, in any combination that works best for you.

Next time you replace suction box covers, forming boards or pipe covers, investigate Ryertex. Call your nearby Ryerson plant.

You will also find many marked advantages in Ryertex paper mill bearings.

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PJT PAPER TRADE JOURNAL

WEEK OF AUGUST 24, 1959

Lee-Simpson Merger Now Completed

Merger of the Simpson Paper Co. of Everett, Wash., with the Lee Paper Co. of Vicksburg, Mich., to form a new corporation called the Simpson Lee Paper Co. has been completed.

Simpson Paper Co., founded in 1891, operates fully integrated pulp, paper and converting plants in Everett as well as a branch converting plant in Los Angeles. It is a wholly owned subsidiary of Simpson Timber Co. W. G. Reed, chairman of Simpson Timber Co., will be chairman of the new Simpson Lee Paper Co. He has been a major stockholder and director of Lee Paper Co. for a number of years.

Maxwell D. Bardeen, former Lee president, will be president of Simpson Lee Paper Co. Vice presidents will include Donald F. McCall, now vice president and general manager of Simpson Paper Co., Norman Bardeen and Albert A. Christian, the latter now general manager of Lee Paper Co. Mr. Christian will become secretary of the new company. Kenneth A. Warren, treasurer of Lee Paper Co., will be treasurer of Simpson Lee Paper Co.

Proposed Stock Exchange Offer in St. Regis-Cornell Merger Announced

St. Regis Paper Co. has filed with the Securities and Exchange Commission a registration statement relative to the issuance of St. Regis common stock to be offered in exchange for the 667,251 shares of capital stock of Cornell Paperboard Products Co.

The proposed offer would provide that if the exchange offer is declared effective, a maximum of 453,731 shares of St. Regis common stock would be issued on the basis of sixty-eight hundredths of a share of St. Regis common stock for each share of capital stock of Cornell.

Cornell operates two paperboard mills, one at Cornell, Wis., and one at Milwaukee, Wis. The Milwaukee mill also converts paperboard into corrugated and solid fibre shipping containers and folding cartons. Cornell has three principal wholly owned subsidiaries: Carton Craftsmen, Inc.; Superior Paper Products Co., Inc.; and Rathborne, Hair and Ridgeway Box Co.

Carton Craftsmen manufactures folding cartons in the Chicago area. Superior operates two plants at Marion, Ind., for the manufacture of pressed paper plates. Rathborne manufactures corrugated fiber shipping containers in Chicago and wood veneer wire-bound boxes in Jackson, Miss., Savannah, Ga., and Maringouin, La. Cornell owns a total of 52,036 acres of timberlands in Wisconsin.

Cornell is one of four corporations that will participate in the ownership of Tennessee River Pulp and Paper Co. which is presently constructing a containerboard mill at Counce, Tenn., scheduled for completion in 1961.

Scottish Pulp Mill Being Planned

The Wiggins Teape Group, Thames Board Mills, Bowater Paper Corp. and the Reed Paper Group are jointly sponsoring a new company, Scottish Pulp (Development), to investigate the possibility of building a chemical pulp mill in the Scottish Highlands.

Such a project has been under consideration for the last 10 years by the Scottish Council, which has seen the need for an outlet for the increasingly large supply of thinnings and offcuts of the sawmill industry, itself a development from the large-scale planting of softwoods in Scotland in the years before and after the war.

The projected pulp mill would produce 70,000 to 100,000 tons of bleached pulp from homegrown softwood and probably be located near Fort William on the West Coast.

Wiggins Teape already has the Sudbrook NSSC pulp mill in Monmouthshire using the hardwood resources of Southern England and Wales. Bowater operates groundwood pulp mills at Kemsley in Kent, and Ellesmere Port in Cheshire, the latter operating on home-produced softwood. These are the only wood pulp mills in Great Britain.

Potlatch Road Bonds Approved by Voters

Desha County, Ark., voters have approved a $225,000 bond issue to finance hard-surfacing of a county road to serve the DeSota Landing site of the proposed $35 million Potlatch paper mill between Rohwer and Arkansas City.

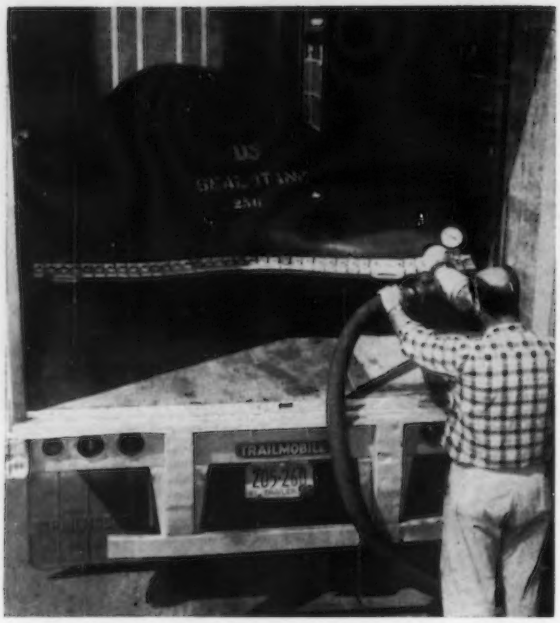
A hard-surface road to the site and a railroad spur were described as the last obstacles to construction of the mill. Building of the spur by the Missouri Pacific Railroad is now under negotiation.

Paper and Board Production

According to the American Paper and Pulp Ass'n. the ratio of the United States production to mill capacity for the week ending August 8, 1959, was 94.9 per cent compared with 93.5 per cent revised for the preceding week. The ratio was 89.3 per cent for the corresponding week a year ago.

The paperboard production ratio for the week ending August 8, 1959, was 98 per cent compared with 98 per cent for the preceding week and 92 per cent for the corresponding week a year ago.

(Detailed statistics on page 58)



GIANT RUBBER bag is used by Knowlton Bros. to bring phenolic resin back to Watertown, N.Y., plant after delivery of special industrial papers to New Jersey customer. Bag is fitted on standard 35-foot truck trailer, holds 3,400 gallons. Here being unloaded by Roland Hoppe, plant engineer for Knowlton, the bag can be rolled up and stowed in small space when empty.

Di Candia May Reopen Paper Mill

Joseph Di Candia, one-time president of the now defunct York Paper Manufacturing Co., has been released from the Federal prison at Danbury, Conn., after serving 21 months on charges involving the misapplication of more than $1 million from an Ellenville, N. Y., bank.

Mr. Di Candia, who lived in York in the years following World War II, later was operator of the Anjopa Paper Manufacturing Co., near Ellenville, which was recipient of an overdraft of $972,000 approved by William R. Rose, at that time president of the Home National bank, Ellenville. The former Yorker was charged with conspiracy.

This figure constituted most of Mr. Rose's $1,255,627 shortage. Mr. Rose was sentenced to five years in prison but is scheduled to be paroled on September 2.

Mr. Di Candia is now working to reopen the paper mill. He is said to have the backing of a syndicate of waste-paper dealers in New York City.

Safety Congress To Feature Talks on Noise Control

Noise control will be the No. 1 topic at pulp and paper sessions of the 47th National Safety Congress, annual convention of the National Safety Council.

The Congress will be held October 19-23 in Chicago. Talks on noise control will be made by: D. Adair, safety coordinator, Pacific Coast Ass'n. of Pulp & Paper Manufacturers, Portland, Ore.—"Ear Protection." Roger B. Maas, hearing consultant, Employers Mutuals of Wausau, Wis.—"Conservation of Hearing." Robert L. Young, noise analyst, Employees Mutual Liability Insurance Co. of Wisconsin, Wausau, Wis. — "Woodroom Noise Exposures and Controls."

Harry H. Saunders, vice president, St. Joe Paper Co., Port St. Joe, Fla., will keynote the ten pulp and paper sessions. Henri M. Aldridge, general counselor, Southern Kraft Div., International Paper Co., Mobile, Ala., will speak at a joint luncheon with the Council's wood products section.

Calcasieu To Complete Expansion Program This Fall

Calcasieu Paper Co., Elizabeth, La., will complete a modernization and expansion program late this fall. The program includes the following new additions: paper warehouse, bag warehouse, inside loading unit for 16 railroad cars, truck loading facilities, finishing room, mill operations offices, administrative offices, personnel offices, bag division extension, automotive repair building, 200,000-gallon water tank, water flume, wood handling unit, paper machine building, lime recovery plant, wood yard, and lighted, paved parking lot.

Letter to the Editor

Dear Mr. Evans:

I read with a great deal of interest, your article entitled "What the Russian Pulp & Paper Industry is Doing." I have also visited Soviet mills —therefore, I would like to make the following comments:

It is true that the mills resemble those in this country or in Scandinavia of from 20 (pre-war) to 30 years ago. On the other hand they have some modern equipment supplied by Finland which is badly installed and wrongly operated. You did not mention that the number of employes for a given tonnage is more than three times higher than in any European or American mills. I agree with you that there are more text books available in Soviet than in most of the other countries due to the fact that the Soviet authorities translate and print text books from other languages and countries without asking the author's permission and very often without even using the author's name.

The published report as well as the chart of "Growth in Soviet Pulp & Paper Production" shows clearly how the industry has expanded so far. In 1940 the Baltic States were occupied by Soviet Army. At once the Soviet acquired an additional seven pulp and paper mills. Eight mills came with the territory taken from Finland (as you mentioned) which Finland was forced to rebuild according to the peace treaty. "The cluster of mills on Sakhalin Island in the Pacific" were taken from Japan. Which country Soviet will conquer to complete the Seven Year Plan to expand further their paper industry is so far unknown.

Yours very truly,
C. Laviste
Richmond Pulp & Paper Co.
of Canada, Ltd.
Montreal, Que.

Editor's Note—Mr. Laviste is correct that the acquisition of Finnish and Baltic mills and Japanese mills has contributed to the expansion of the Soviet industry. However, the fact is that the Russians have built a number of mills and are now planning the construction of over a dozen real large ones.

Kraske Retires from

technical supervisor; Russell White,

Columbia Box Board Names

Ground Broken For Expansion of Rome Plant

Ground was broken on August 14 for a $27 million expansion of the Rome Kraft Co.'s container board plant. The expansion will double the facilities of the liner board plant, owned jointly by Mead Corp. and Inland Container Corp.

Herbert A. Kidd, vice president and general manager of the Rome Kraft Co., operated a bulldozer and broke the earth which marked the official beginning of construction.

Following the ceremony, Henry C. Goodrich, vice president of The Rust Engineering Co., which has the contract for construction, presented Mr. Kidd with a miniature silverplated bulldozer as a momento of the occasion.

Turbine Aeration of River Water Proves Successful

Eight tons of dissolved oxygen are being added to the Fox River in Wisconsin every day between Kimberly and Little Rapids through turbines that have been specially modified for stream improvements by four pulp and paper mills, the Wisconsin Pulp & Paper Information Service has announced. This exceeds by 20 per cent the 38 tons of oxygen that state pollution authorities calculated would restore the Fox River to a satisfactory oxygen balance after their most recent survey of that stream.

Turbine aeration is a newly developed technique that has been experimentally tested during the past three years to replace oxygen in streams whose oxygen content has fallen below desired levels. It is expected that it will be adopted at more and more power plants on streams where higher proportions of dissolved oxygen are needed.

Mills currently utilizing turbine aeration on the lower Fox River are: Charmin Paper Products Co., Little Rapids; Combined Locks Paper Co., Combined Locks; Kimberly-Clark Corp., Kimberly; and Thilmany Pulp and Paper Co., Kaukauna.

Looking for a new position?

Looking for new personnel?

Keep your eye on our Classified Advertising Section

PAPER PEOPLE

Two Rejoin Crystal In Key Posts

Appointment of two men to key positions with the Crystal Tissue Co. has been announced.

Rodney H. Michael returns to Crystal to become the first controller in the history of the company. Harry E. Meyer, returns to become paper machine superintendent.

Mr. Michael has had considerable accounting experience. He did cost work before joining Crystal in 1947 as cost manager. After 10 years at Crystal, Mr. Michael went to Raymond Bag as controller for three years.

Mr. Meyer is a veteran papermaker of nearly 40 years and has worked at Crystal on three different occasions. He began his paper career there. Mr. Meyer has been superintendent for the past 16 years of the Sitrue Paper Co. and the Dunn Paper Co. In his new capacity he will be responsible to John Burdsall, vice president in charge of manufacturing.

Force Joins Latex Fiber Research Staff

Carlton G. Force, an organic chemist, has joined the research and development staff of Latex Fiber Industries, Inc., Beaver Falls, N. Y.

Mr. Force is a graduate of Clarkson College of Technology where he earned a B.S. degree in chemistry. He continued his studies at the University of Illinois where he was awarded an M.S. degree in chemistry.

Petersen to Head Westvaco Personnel Dept. Section

West Virginia Pulp and Paper Co. has appointed Paul M. Petersen to head the recruitment, development and safety section of the personnel department, at its head office.

Mr. Petersen, formerly supervisor of training at the company's Mechanicville, N. Y., mill, will work out of the New York office and coordinate recruitment, appraisal and development, training and safety programs for West Virginia's corporate staff and eleven operating divisions.

L. W. Gould

Gould Becomes C-Z V-P & Eastern Div. Mgr.

Leslie W. Gould of St. Louis has been appointed an assistant vice president of Crown Zellerbach Corp. and manager of its eastern division.

Mr. Gould, who has been a Gaylord packaging division vice president for bag and paper sales, took over his new duties in New York City on August 12. He succeeds the late Wayne A. Brown, who died last May.

Beginning his career with Gaylord in 1934, after his graduation from Louisiana State University, Mr. Gould was named sales office manager for the Bogalusa, La., mill in 1937. During World War II, he took a leave to serve as a special agent for the Federal Bureau of Investigation.

From 1944 to 1945, he was Gaylord's eastern division sales manager in New York. He returned to St. Louis in 1946 as general sales manager of the bag and paper division, and was elected a divisional vice president in 1956.

St. Regis Advances Corbin To New Position

St. Regis Paper Co. announces the appointment of Joseph P. Corbin, planning engineer with the central engineering department, Pulp and Paper Division, to the staff of J. A. McDermott, general manager, Pulp and Paper Division, effective September 1.

In this capacity Mr. Corbin will work with the company's Printing Paper Division mills from divisional offices at Deferiet, N. Y.

Kraske Retires from Oxford Paper Co.

W. H. Kraske has retired after 51 years of sulphite pulp manufacturing experience, with 42 years in a supervisory capacity. He has worked in Ontario, Quebec, Newfoundland and the United States, the last ten years as supervisor of sulphite, groundwood, and bleaching with the Oxford Paper Co. of Rumford, Me.

Mr. Kraske plans to reside in Rumford, Me., and will be available for consulting work on a limited basis.

C-Z Announces Personnel Changes

Crown Zellerbach Corp. has announced the following appointments.

John Kowalchyk, sales representative, Gaylord Texas division, has been promoted to assistant sales manager at Plymouth.

At the St. Helens mill, Royal Graff, chemist, has been appointed technical assistant superintendent, paper machines; Bert Pasero, beater room supervisor, is now machine and beater room supervisor; Christopher Van Leeuwen, assistant technical supervisor, is technical assistant to the pulp mill supervisor; Bert Zurcher, technical assistant to the paper machine superintendent, is assistant technical supervisor; Russell White, maintenance mechanic, is technical assistant to the mechanical supervisor; and Hub Franson, pulp shift supervisor, is pulp mill assistant supervisor.

George Potter, chemist, has been made technical assistant to the pulp mill supervisor at Bogalusa.

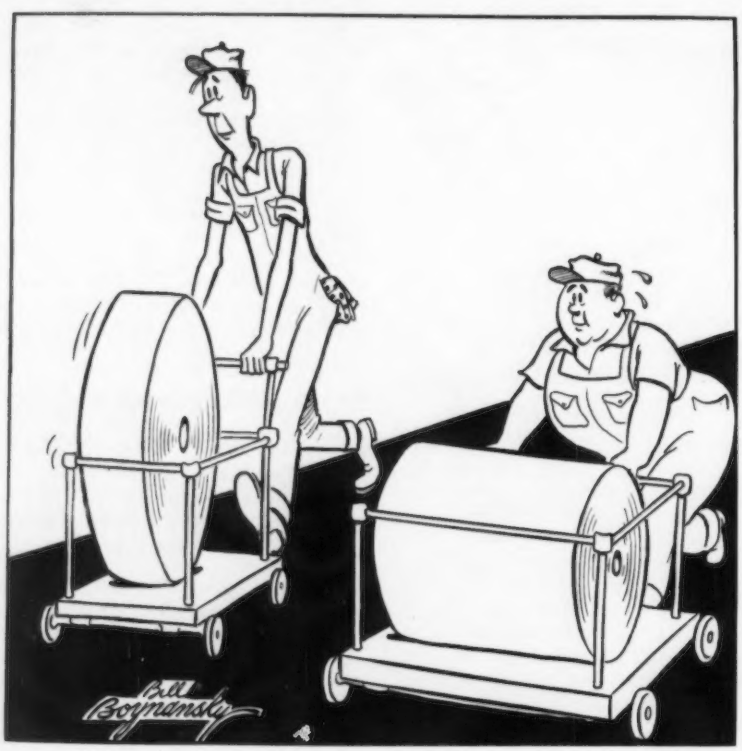
Henry Robison, who previously was with Bowaters Southern Paper Corp. at Calhoun, Tenn., comes to St. Francisville as a chemist.

Westminster Paper Announces Appointment

A recent eastern management appointment at the Westminster Paper Co. has been announced by John Ashby, executive vice president.

C. Newton Hagar, who has been technical director in the company's New Westminster, B. C., mill, has been promoted to the newly created position of assistant plant manager of the company's eastern operation, the Crabtree Division, at Crabtree Mills, Quebec.

Mr. Hagar directed the technical division at New Westminster for the past five years. Prior to his joining the company, he supervised the chemical and technical work of the Diamond Match Co. at Plattsburg, N. Y. Mr. Hagar is a graduate of the University of Michigan.



Columbia Box Board Names Fussell to New Post

Columbia Box Board Mills, Inc., has announced the appointment of O. P. Fussell as special assistant to Robert R. Howarth, executive vice president. Mr. Fussell, who has had wide experience in the paperboard manufacturing field, will handle assignments in the areas of production controls, output and quality, equipment studies, new equipment operation, storage and inventory control, packaging, material handling and movement of finished goods.

St. Regis Adds Engineers At West Carthage Plant

The St. Regis Paper Co.'s central technical department has engaged two engineers for its plant at West Carthage, N. Y., Roy Swenson, formerly of Forest Hills, L. I., and Donald R. Schutts, formerly of New London, Conn.

Mr. Swenson is a 1954 graduate of the College of Forestry at Syracuse university, where he received his bachelor of science degree in pulp and paper technology. A research engineer, he comes here from the Great Northern Paper Co. of Millinocket, Me., with which he has been associated for the past five years.

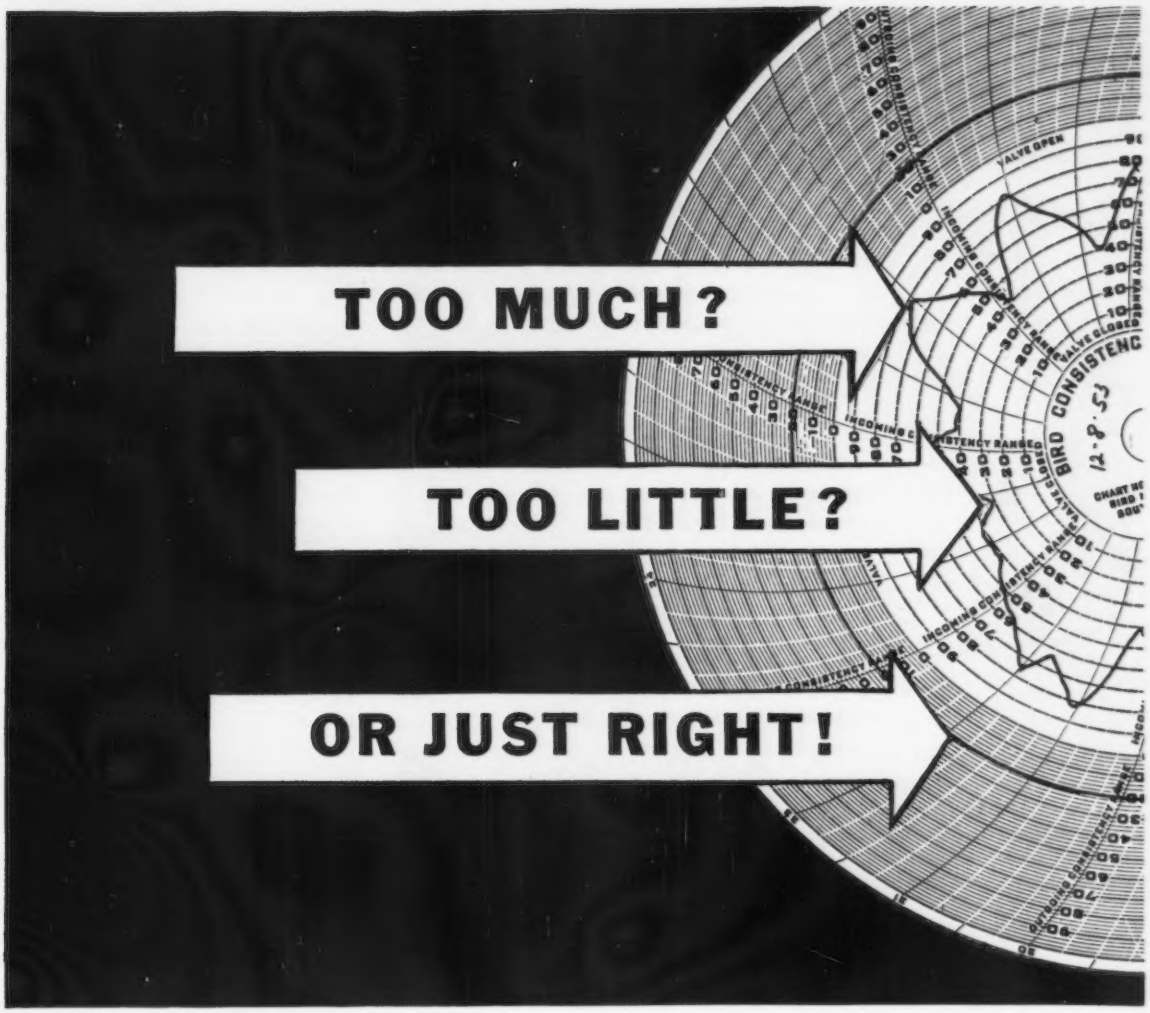
Mr. Schutts, an army veteran of two years service with the chemical corps, in Canada and Alaska, also has a B.S. degree in pulp and paper technology earned in 1952 at the College of Forestry, Syracuse. Following his graduation he was employed as a chemist in Pensacola, Fla., and Macon, Ga., by the Armstrong Cork Co. His most recent position was that of assistant plant chemist at the Uncasville, Conn., plant of the Robert Gair division of the Continental Can Co.

Donnacona Announces Four Appointments

Donnacona Paper Co., Ltd., Montreal, has announced the appointments of Palma Leborgne as paper mill superintendent; Leo Dube as assistant paper mill superintendent; Robert D. Fels as board mill production superintendent; and Walter Shisko as board mill chemist.

Mr. Leborgne, who has been assistant paper mill superintendent, has had over 30 years experience in the manufacture of paper with a number of different companies.

Mr. Dube has had over 30 years experience in the paper industry having worked for Consolidated, St.



BIRD CONSISTENCY REGULATORS

maintain basis weight control precisely and continuously, thus avoiding rejects from underweight and loss of fibre and money from overweight.

Over and over, they are proving their dollar-saving value ahead of the paper machine, ahead of the Jordans, after plunger pumps at stock chests, ahead of knotters, after washers — wherever accurate consistency control puts dollars in your pocket.

Stock consistency is held to not more than 0.1% heavier or lighter than desired. Float type indicator controls consistencies from 0.5 to 4.5%; screw type indicators may be used for consistencies up to 8%.

Ask for layouts and estimates.

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Lawrence, Quebec North Shore and Price Brothers.

Mr. Fels, a graduate of Queen's University where he received his B.S. degree in chemical engineering, served for four years with the Chemical Division of Dominion Tar and Chemical Co., joining Donnacona in 1955. He started as assistant chemist in the paper mill laboratory and since 1956 has been board mill chemist.

Mr. Shisko, who received his B.S. in chemical engineering at Queen's University, joined the company in 1959 after four years experience in the chemical and paper manufacturing industries.

Recent Staff Appointments At Scott's Chester Mill

The Scott Paper Co. plant engineering division has announced the promotion of George B. Myers to senior project engineer in the finishing design section.

Mr. Myers joined Scott in 1956 as an engineering trainee upon graduation from Pennsylvania Military College. He became a project engineer in October of that year, and in January 1958, he was named mechanical assistant to the finishing superintendent for a period of six months.

Howard E. Riddell and Walter T. Bottomley have been promoted to new positions in the staff engineering division at Chester.

Mr. Riddell has been promoted to senior designer from the position of designer. He joined Scott in November 1953 as a draftsman in mechanical development. He was later promoted to senior draftsman, then junior designer. In his new position, Mr. Riddell will be working on paper ing design section.

Mr. Bottomley joined the company in December 1954 as a draftsman and was subsequently promoted to senior draftsman and junior designer. He has been promoted to the position of designer in the converting design section.

Ralph G. Young, Jr., has been selected for the position of manager of staff engineering. He has been special assistant to the director of staff engineering for the past year and a half.

Mr. Young joined Scott in July 1949 as a member of the mechanical development department. Later that year, he was assigned to South Glens Falls as plant engineer and subsequently to Fort Edward in the same capacity. In January 1955 he became engineering assistant to the vice

president in charge of production. In February 1956 he became assistant mill manager at Mobile, serving there until early 1958.

David W. Traub has been promoted to the position of senior project engineer in the paper mill design section of staff engineering. Mr. Traub joined the company in July 1950 as an engineering trainee in the engineering department in the Chester plant, and in July 1951, he became a project engineer. During June 1954 he was promoted to senior project engineer, his present position.

William D. Holak has been promoted to the position of chief analyst in the operations research division. Mr. Holak joined the company in December 1955 after receiving his doctorate in physics from Pennsylvania State University. He was initially employed in the mechanical research department and joined the newly formed operations research division in January 1959.

Earl H. Beck has been promoted to the position of industrial engineer in the Chester plant's industrial engineering department. Mr. Beck joined Scott Paper Co. in June 1957 as an engineering trainee following his graduation from the University of Delaware.

Two Mead Corp. Appointments Announced

William M. Newton has been named associate director of corporate warehousing for the Mead Corp. In announcing the promotion, George H. Pringle, executive vice president, said Mr. Newton will have his office in Dayton, Ohio, and will report to Robert P. Arvold, recently appointed coordinator of central planning, white papers.

The new associate director of corporate warehousing will be responsible for developing and implementing inventory control procedures, coordinating procedures and practices of Mead's white paper warehouses, standardizing packaging within the corporation, and providing liaisons between Mead's operating divisions, Mead Papers, Inc., and Mead merchants in warehousing practices and policies.

As coordinator of central planning, white papers, Mr. Arvold is responsible for the production planning and control and scheduling of the corporation's white paper mills. Mr. Newton has been associated with Mead in various capacities, all at the Chillicothe, Ohio, division, since his graduation from Rensselaer Polytechnic Institute in June, 1950.

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PTJ NEW LITERATURE

Atlas Rezklad
Flooring Materials

Tells how this monolithic corrosion-proof flooring can be applied directly onto the concrete slab or on existing floors to up-grade the surface. Also describes the properties and resistance to wear. Bulletin 3-4. Atlas Mineral Products Co., Mertztown, Pa.

Pre-Built Sectional
Belt Conveyors

Provides information on the use and selection of standardized Pre-Bilt sectional belt conveyors which are pre-engineered and shop-assembled from matched Link-Belt components. 40p Handbook 2779. Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill.

Betz Laboratory
Demineralizer

Describes this demineralizer and gives complete details of construction, capacity, flow rates, etc. This is a portable unit for either laboratory or plant use. Bulletin 595. Betz Laboratories, Inc., Gillingham & Worth Sts., Philadelphia 24, Pa.

Equipment, Systems
and Controls

Describes and illustrates equipment, systems and controls for the process industries, including weightometer and telemetering systems for flow control; controlled feeding equipment and proportioneering systems. Bulletin B-I-F 5.1. B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R. I.

Fuller Pneumatic
Conveying Equipment

Discusses the role of this equipment in the pulp and paper industry. Includes 18 photographs and nine drawings describing 11 installations covering the handling of salt cake, wood chips, lime, soda ash, pulp knot rejects and various clays. Bulletin FF-26-2 Fuller Co., Catasauqua, Pa.

Blue Face Cast
Iron Pulleys

Provides close-up photographs of various type pulleys and complete specifications concerning diameter, face width, crown, rim thickness, hub, keyseats and set screws, arms, balance, etc. Bulletin 33-A Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Capstan
Grips

Tells how these grips quickly and positively grip hard to hold flexible sheet materials for tensile strength testing in the textile, plastics, and other industries. Bulletin 119-TT. Thwing-Albert Instrument Co., Penn St. & Pulaski Ave., Philadelphia 44, Pa.

Four-Way
Pallets

Tells why 4-way pallets are so useful and the advantages they give. Also lists numerous problems with the wrong way to solve them and the 4-way way. Bulletin. Signode Steel Strapping Co., 2600 North Western Ave., Chicago 47, Ill.

Rex Rated
Water Knife

Contains new water knife selection data, complete specifications and application information for a number of industries. Selection procedure is presented in simplified, outline form and is color-coded for various market applications. Bulletin 5983. Chain Belt Co., Sales Promotion Dept., Milwaukee 1, Wis.

Vertical Turbine-Type
Pumps

Describes a wide range of applications. These are available in 40 sizes 20 to 8000 g.p.m. at heads to 400 feet or more. Bulletin 08B9409. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

S/P High
Velocity Dryer

Contains data about drawings on this dryer and explains in detail how it can increase production and dry webs more uniformly. Bulletin. J. O. Ross Engineering, Div. Midland-Ross Corp., 730 Third Ave., New York 17, N. Y.

Toledo Automatic
Checkweigher

Illustrates and describes the features and advantages of the Model 9460 automatic checkweigher which handles bags, boxes, packages, slabs, blocks and other items while in motion, within a weight range of 50 to 200 pounds. Form 2968. Toledo Scale Corp., Toledo 12, Ohio.

Belt Idlers and
Conveyor Pulleys

Carries complete information on Rex rated idlers for intermediate or moderate loads at moderate speeds. Also contains information on welded steel pulleys for belt conveyors, bucket elevators and package-duty service. Bulletin 5980. Chain Belt Co., Milwaukee 1, Wis.

Allis-Chalmers
Lift Trucks

Covers engineering and design features and accessories to various types of lift trucks. Bulletins BU-600, BU-498, BU-497, BU-499 and BU-465-A. Allis-Chalmers Mfg. Co., Engine-Material Handling Div., Milwaukee, Wis.

American Crawler
Crane Excavator

Illustrates and describes the many exclusive time-saving features claimed by the company on the 500 Series crawler. Catalog 750-CG-1. American Hoist & Derrick Co., St. Paul, Minn.

A Study in
Dimension

Covers warehouse layout — narrow aisles or wide? Gives both the advantages and disadvantages to this costly problem so that material handling engineers may decide which type is best for his installation. Brochure. Automatic Transportation Co., 149 West 87th St., Chicago, Ill.

B&W Croloy
25-20 (TP310)

Gives the chemical composition, size ranges, and short time high temperature tensile and rupture properties of this alloy. Data Card TDC-195. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Modern Methods of Mechanical Pulp Manufacture

This book comprehensively covers all aspects of groundwood pulp production. The author, K. H. Klemm, has a broad knowledge of groundwood manufacturing methods and has been associated with groundwood mills on both sides of the Atlantic. Price: $5.00.

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Lithographic Progress & Paper Problems

The major advances in lithography in the past two years have been the:

1. General improvement in quality of color reproduction
2. Swing to the use of aluminum plates
3. Introduction of new systems for dampening plates on offset presses
4. Tremendous growth of web offset.

The speaker expanded briefly on each of these subjects and summarized the work which LTF is doing in its research to encourage or supplement these trends.

The general improvement in quality of color reproduction has been the result of LTF's survey of color reproduction made two years ago, and the introduction of the concept of balanced inks. There is now a much better understanding among lithographers of the relationship between paper and ink, and the importance of using pigments that are balanced in their color errors so that not only are the photographic operations and masking simplified, but the color reproduction itself is improved. The increased use of electronic scanning has also contributed to this improvement of quality.

Platemaking

The most important improvement in lithography since the end of World War II has been in the area of platemaking. In the last two years there has been a significant trend away from the use of zinc and into the use of aluminum. Aluminum has a number of advantages. It is lighter in weight, in color, has better water receptivity, prints sharper, and does not stretch during printing. The introduction of the copperized aluminum plate has been responsible for a considerable improvement in quality and consistent good performance on the press. Presensitized plates have also gained in use and, during the last two years, wipe-on coatings have been introduced. Plates that were once the source of very serious trouble in lithography are now subject to control.

Dampening Problems

Dampening, or the amount of water needed to keep a plate printing properly on the press, has always caused some trouble with paper. The trend in lithography has been in the direction of running with less water. Many plants are replacing the Molleton covers with parchment paper covers which allow better and more uniform control of water. The mullen dampening system, which operates on the principle of applying an excess of dampening water to the plate and blowing the excess off with an air blade, has been successful in establishing an ink-water balance rapidly on the press and making it possible to print letterpress papers. The system, however, is quite complicated and expensive. The latest development in dampening is the Dahlgren system, which operates on the principle of applying the water to the ink and letting the first ink form roller apply the moisture to the plate. By keeping all of the rollers in the dampening system water receptive and never allowing the water to go through an ink nip until is reaches the plate, the Dalhgren system is also capable of establishing an ink-water balance very rapidly and makes is possible to print on letterpress papers. With this work in new dampening systems, the water problem in lithography is gradually disappearing or is being corrected.

Web Offset

One of the most significant trends in lithography today is the increased use of web offset. By 1957, the quality of web offset was up to that of web letterpress. In 1958, its quality approached that of sheet fed lithography. In addition to the problems of register and cracking of plates, the main problems still remaining in web offset are with paper. These include variation in tension in the roll, dust and dirt on the paper, water sensitivity of coatings, piling, picking, variation in moisture in the roll, and blistering when going through the dryers. These paper problems are now holding up further advance in web offset.

"THE BOSS THINKS THAT BECAUSE I'M NEW HERE HE CAN PULL MY LEG···HE ASKED ME TO 'PRESS' A STONE."

LTF Research

After these remarks, Mr. Bruno described the research being done at LTF which is contributing to the rapid advance of the lithographic process. These studies include the development of a new instrument for measuring the moisture pick of paper, determination of causes of tinting and ink emulsification, and factors affecting ink gloss and scuff resistance. An important study is the investigation of the forces involved in the transfer of ink from one surface to another. When more is known about the exact mechanism of ink transfer, it may be possible to design better inks and papers to fit the requirements.

In LTF's studies of quality, an instrument is being designed that will measure quality while the press is running. Eventually an instrument can be developed to control quality automatically on the press. Considerable work is being done on color reproduction. Of special interest to paper manufacturers is the study of the effect of paper whiteness on the color of ink. Mr. Bruno demonstrated this effect by comparing a fluorescent impregnated paper, a cast-coated sheet, and an ordinary coated sheet using a rotating disc. The effect of the fluorescent brightness was to degrade the tints.

Summary

In summary, Mr. Bruno emphasized that many developments were being made in the lithographic process . . . that quality is continually improving . . . and that the trouble spots are gradually being eliminated. While the number of paper problems referred to the laboratory for study has increased tremendously, he pointed out that the increased use of LTF evaluation services by paper mills is an encouraging indication of their recognizing the advantages of a better understanding of the needs and requirements of the process.

Excerpts from talk by Michael H. Bruno, research director, Lithographic Technical Foundation, to the Salesmen's Association.

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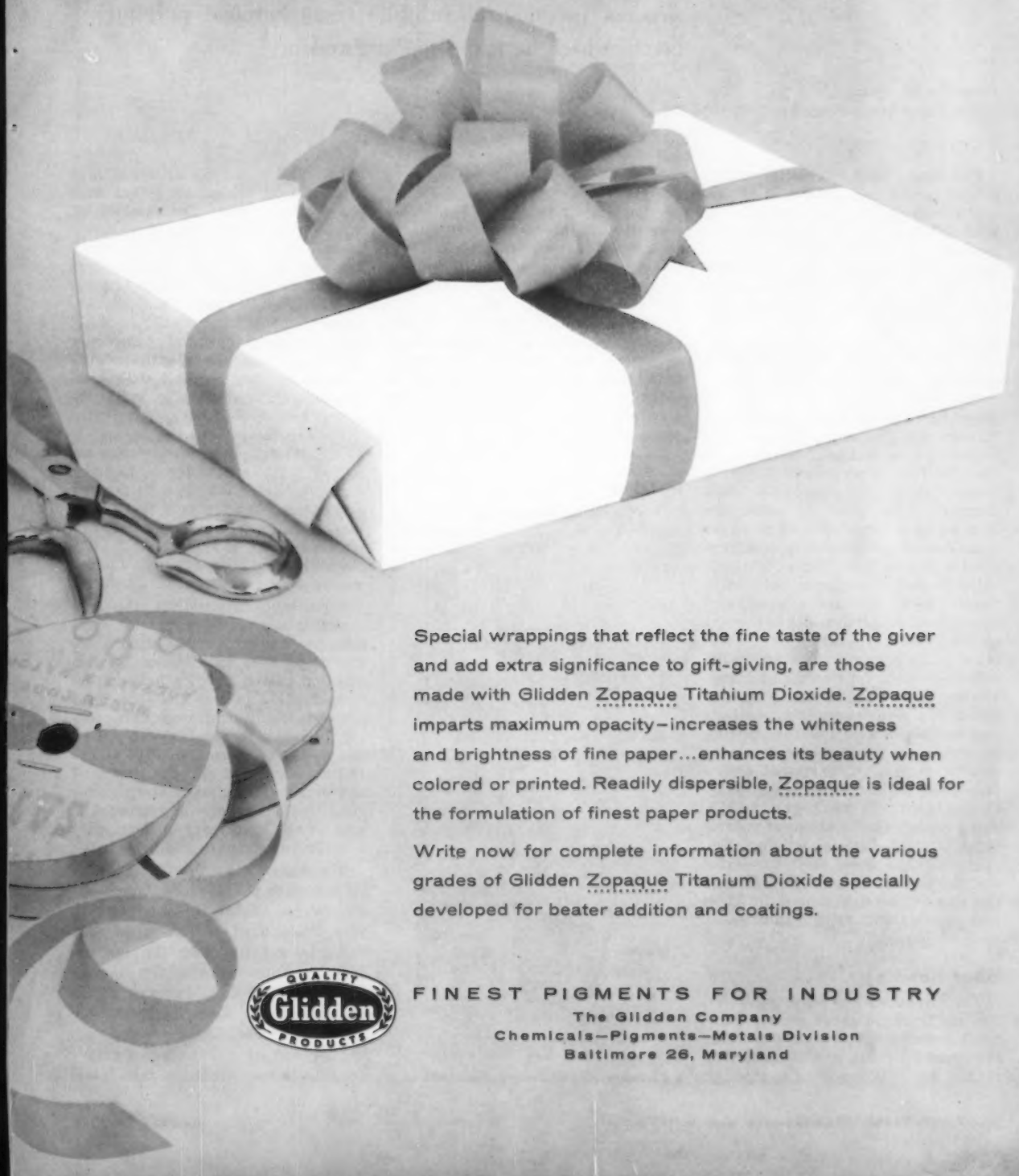

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Something New — In Semi-Chemical Pulping of Hardwood

A technical report by the editor on the Stora Kopparberg process for neutral sulphite semi-chemical pulping of birch, which he inspected in Sweden.

John C. W. Evans,
Editor, Paper Trade Journal

One of the most interesting installations seen by the editor on his recent European tour was the hardwood semi-chemical pulp mill of Stora Kopparberg A. B. at Kvarnsveden in Sweden. The process used, which the company calls the Stora Brite-chem process, has aroused much interest in most Nordic countries and the Russians sent their experts to examine it. This is the first description published anywhere of this operation.

The giant Swedish industrial company, Stora Kopparberg, operates a 700 ton per day newsprint and publication paper mill near Borlange on the Dalelven river about 10 miles from Falun, the company's headquarters. This plant is called the Kvarnsveden paper mill. The paper machines have, in the past, been supplied with pulp from the conventional sulphite and groundwood pulp mills. Several years ago the company decided to utilize birch which is present as about 15 per cent of the forest stand in Dalarna province, where the mill is located, for newsprint manufacture. Following extensive investigation of the various pulping methods and equipment available for utilizing hardwoods, a process was developed by the research department and a plant was built. Commercial production of birch pulp was begun in 1958, using Stora's modifications of neutral sulphite semi-chemical pulping. The operation has been very successful and the present output of 55-60 tons per day is being increased to 75-80 tons per day without the addition of new equipment.

Wood Handling

The birch logs are delivered to the mill by truck in three meter (nine foot) lengths. It is unloaded from the trucks by crane and stored in ranked piles. Wood from storage or trucks is carried by a conveyor to drum barkers. (Due to the difficulty of barking birch a considerable quantity of the wood is circulated back to the barkers.) The barked logs are conveyed to a four-knife chipper. Chips are cut to about ¾-inch size and stored in a chip bin.

Cooking liquor is obtained in the customary manner by sulphitation of a caustic soda solution in a tower, with sulphur dioxide, obtained by burning sulphur. The sulphur dioxide absorption tower is equipped with automatic pH control.

Cooking

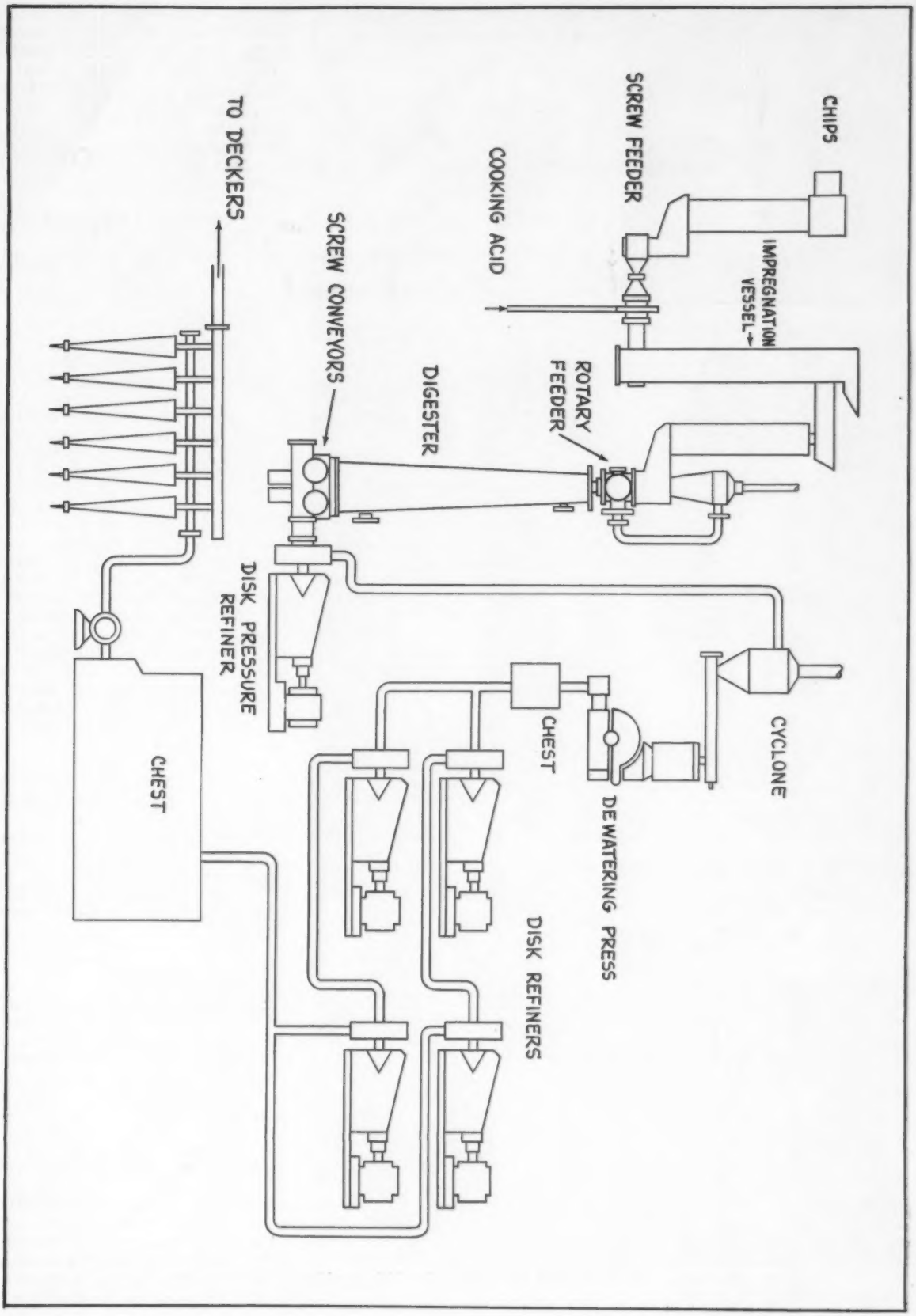
The cooking equipment used was supplied by A. B. Defibrator of Stockholm. The chips are delivered first to a vertical bin which serves as a pre-steaming vessel for removal of air. From here they drop into a screw feeder which compresses the chips, removes excess water and delivers them under pressure into an impregnation chamber. Hot NSSC cooking liquor (at 80°C. to 100°C.) is added continuously at the outlet of the screw feeder so that the chips are submerged as they expand after compression and rapidly absorb the liquor. The screw feeder delivers the chips and liquor into the bottom of a tall vertical impregnation chamber so that they are under hydrostatic pressure. Retention time in the impregnation chamber is 5 to 15 minutes. The chips are pushed up the impregnation chamber and discharged into a hopper mounted above the adjoining continuous digester.

★ Borlange, site of Kvarnsveden Mill.

Advantages stated for the presteaming and pre-impregnation steps are: pre-steaming removes air from the chips thus facilitating the absorption of the cooking liquor; pre-impregnation insures that the chips are thoroughly saturated with cooking liquor before being exposed to the high temperature (160°C. to 180°C.) in the digester; danger of hydrolysis of cellulose in the digester is eliminated and pre-impregnation is said to result in more uniform pulp with higher strength and brightness.

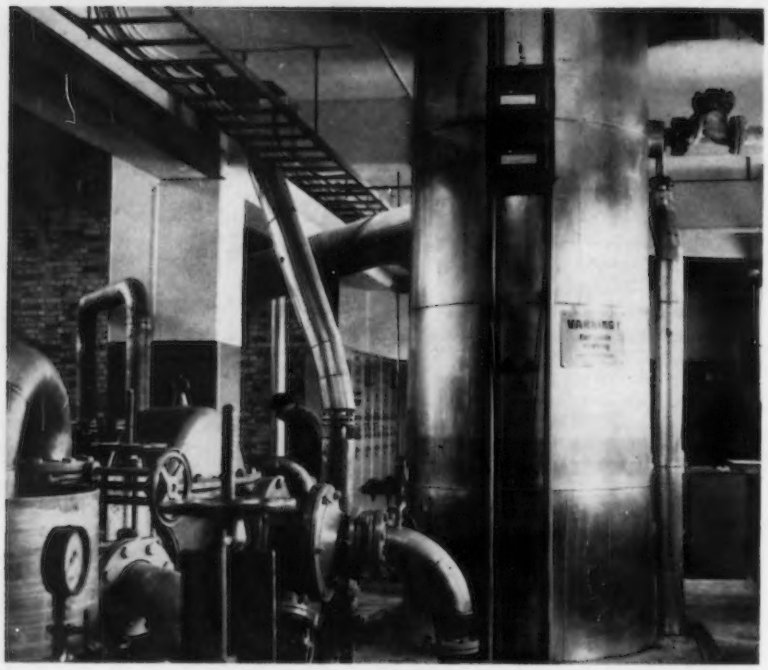
The digester is a vertical cylindrical pressure vessel which tapers out downwards slightly in order to prevent arching of the chips as they move by gravity down through the digester. Dimensions of the digester are: height 25 feet, diameter at top 40 inches, and diameter at bottom about 47 inches. Chips are fed into the digester by a three-pocket rotary feeder, necessitated by the steam

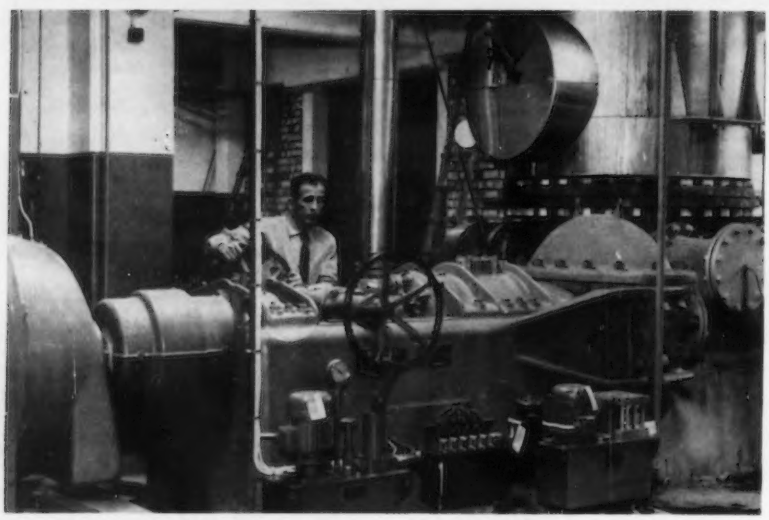
←Rotary feeder delivers chips under pres- pressure inside the digester. The


CHIPS
SCREW FEEDER
IMPREGNATION VESSEL
COOKING ACID
ROTARY FEEDER
DIGESTER
SCREW CONVEYORS
TO DECKERS
DISK PRESSURE REFINER
CHEST
CYCLONE
CHEST
DEWATERING PRESS
DISK REFINERS

←Rotary feeder delivers chips under pressure to top of continuous digester.

↓ Main section of digester. Note adjustable gamma-gauge level controller on tracks.





Digester (upper right) discharges through Asplund Defibrator unit which provides preliminary refining.

pressure inside the digester. The feeder is mounted directly on the top flange of the digester. The pre-impregnated chips with very little free liquid fall by gravity from the chip hopper into the rotary feeder. As the rotor turns the pockets fill with chips and are discharged into the digester. A rotary feeder is used here rather than the screw feeder used earlier because the pressure applied in the latter would remove some of the cooking liquor from the chips. Also a more uniform feeding rate is provided. The rate of chip delivery to the digester is adjusted by means of a variable speed motor on the feeder.

The level of chips in the digester must be kept constant in order to maintain the predetermined cooking time for any production rate. A gamma gauge level controller is used. The controller may be positioned for any desired level in the digester. The signal at the receiver end of the unit is used to control the speed of the feeder motor, so as to maintain a predetermined chip level. The digester is heated by the direct addition of steam and cooking takes place essentially in the vapor phase. Cooking temperature is 160°C. to 180°C. and pressure is 110 to 130 p.s.i. Retention time in the digester is 30 to 60 minutes, depending on the temperature, etc. Due to the low liquor to wood ratio, steam consumption is quite low, about 1400-1500 lbs. per A.D. ton. Overall connected horsepower on the pre-impregnation chamber, digester and Asplund Defibrator is about 400.

All parts of the cooking system in contact with steam and cooking liquor are made of stainless steel and special alloys are used for parts subjected to wear. The pre-impregnation chamber, feeders and digester are all of Defibrator Co. manufacture. The vertical continuous digester is a new design.

Preliminary Refining

The bottom of the digester is fitted with two internal screw conveyors which carry the cooked chips to a third screw which delivers them directly at digester temperature and pressure to a disk refiner. This is the well-known Asplund Defibrator which is equipped with one rotary and one stationary disk . Here preliminary refining takes place under pressure. The defibrator housing is equipped with a packing box around the main shaft to prevent any steam leakage. Temperature in the defibrator is 160°C. to 180°C. and pressure is the same as in the digester, i.e. 110 to 130 p.s.i. The resulting pulp is discharged con-

tinuously by a reciprocating valve attached to the defibrator housing, and blown to a cyclone separator where water is added to condense the steam and to dilute the thick stock to the desired consistency for the next step.

Washing and Final Refining

A screw conveyor carries the pulp from the bottom of the cyclone to a DKP press where spent cooking liquor is extracted. The DKP press is a new Defibrator Co. design of the Davenport press which works as follows: There are two conical rotors equipped with screen plates, mounted on two separate non-parallel shafts which cause the distance between the rotor screen plates to decrease from the inlet to outlet. The rotors turn at a speed adjustable from 1.5 to 6 revolutions per minute. The space between the rotors is controlled by hydraulic cylinders. Pulp is fed in between the two rotors and thickened to a high density, removing most of the waste cooking liquor.

The pulp is then diluted and drops to a chest. From the chest it is pumped to single-disk refiners (Asplund Raffinators). There are two lines of these refiners, operating in series, with two refiners in each line. The stock from the refiners drops to a storage chest. It is drawn from the chest, diluted and passed through a battery of centrifugal cleaners. The cleaned pulp is deckered and sent to the paper machine.

Pulp Quality

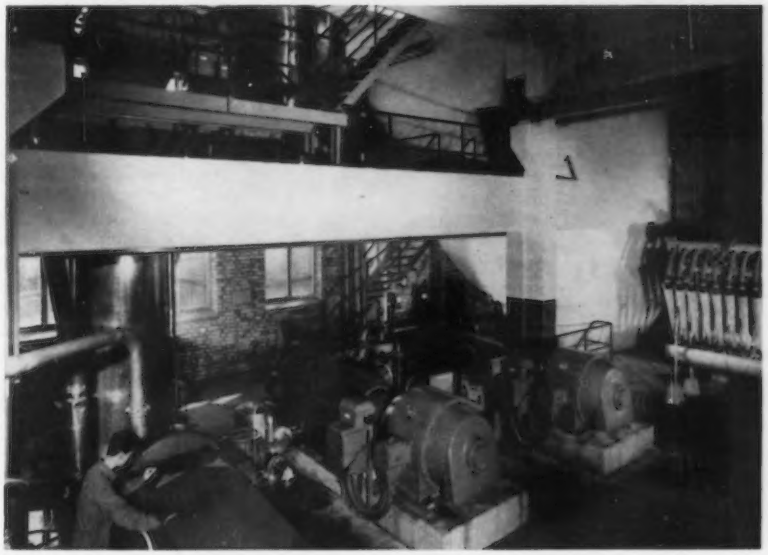
Pulp yield is about 85 per cent. Brightness is considerably higher than the mill's spruce groundwood and sulphite, around 60—65 G.E. Pulp strength is much higher than the groundwood and approaches that of the unbleached sulphite. The following table gives some comparative data on the pulp:

	Birch	Gw'd	Sulphite
Brightness G.E.	60-65	55-60	56-62
Breaking Length	7000-8000	3300	7000-8000
Double folds	700-1500	35	1000-2000

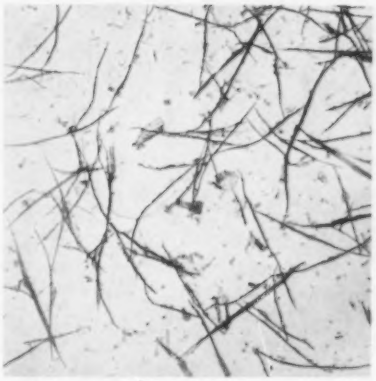
The high brightness of the Stora Brite-chem pulp is particularly notable.

This birch NSSC pulp is used to make up 10 to 15 per cent of the newsprint furnish. There is a slight increase in porosity and brightness of the newsprint. One of the greatest advantages in using the birch pulp was the improvement in sheet formation and machine operation made possible by the lower machine headbox consistency which its better drainage permits.

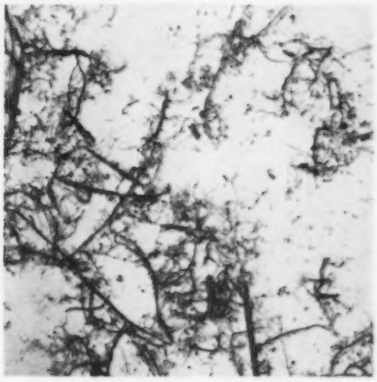
DKP press which removes spent liquor prior to secondary refining.



Three of the four disk refiners, which provide secondary refining.



Birch NSSC pulp fibers at 15X magnification.



Groundwood pulp as made at Kvarnsveden, 15X.

Winter view of Stora's Kvarnsveden mill.

About the Kvarnsveden Mill

The Kvarnsveden mill produces about 195,000 tons per year of newsprint and 25,000 tons of publication papers. In addition it makes a small quantity of building paper and its own wrapper stock and core paper.

Spruce is used in the groundwood mill. The sulphite mill uses both spruce (90 per cent) and pine chips (10 per cent) from the saw mills. Use of small size wood in the sulphite mill from forest thinnings is increasing considerably. More than half the wood consumption comes from Stora's own forests, the remainder is purchased as logs or sawmill chips.

Barking drums, both continuous and intermittent types, are used for logs intended for the groundwood mill. Finnshyttan (Hillboom) pocket type friction barkers are used on wood intended for the sulphite mill, since this contains small diameter thinnings which would be broken by the action of a barking drum.

There are two separate grinder rooms. One has 11 Voith continuous type grinders driven by individual 2,100-h.p. hydraulic turbines. This grinder room is equipped with Jonsson knotters and Cowan and Trimbey fine screens. The other grinder room has six similar Voith grinders driven by separate 2,300-h.p. synchronous motors. This mill uses Reener screens for bull screens and Cowan and Trimbey types for fine screening. Total groundwood capacity is about 180,000 tons per year.

The sulphite mill has both pyrites and sulphur burners. The pyrites come from the company's extensive mining and metallurgical operations. There are five digesters of which one is stainless steel lined. Indirect cooking is done using the Schauffelberger (NAF) circulating system. Jonsson knotters are used followed by Cowan screens. Final cleaning of the sulphite pulp is accomplished with three stages of Centri-cleaners.

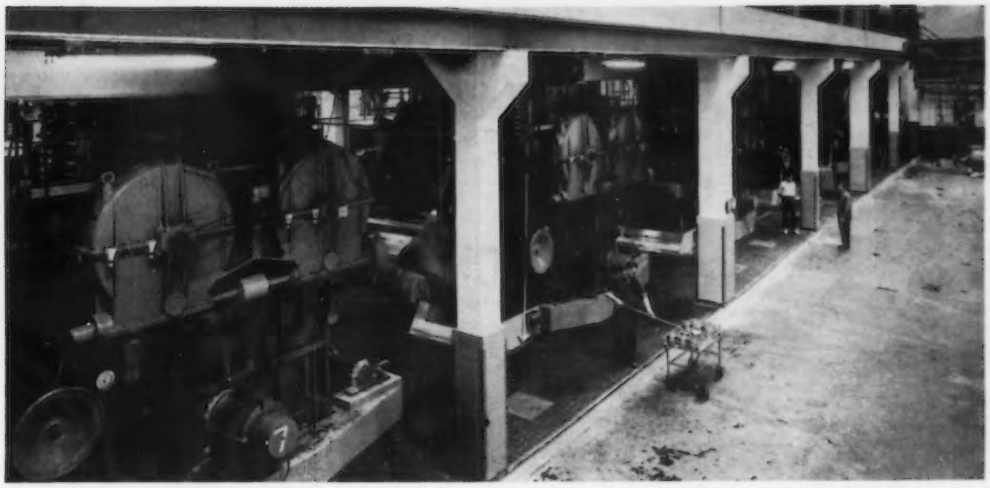
About 40 per cent of the pulp produced here is high yield pulp made at a yield of 67 per cent.

As is customary in Sweden, alcohol is produced from the sulphite waste liquor. A triple-effect Rosenblad vacuum evaporator is operated in connection with the alcohol plant. The sulphite waste liquor is burned eventually for steam generation.

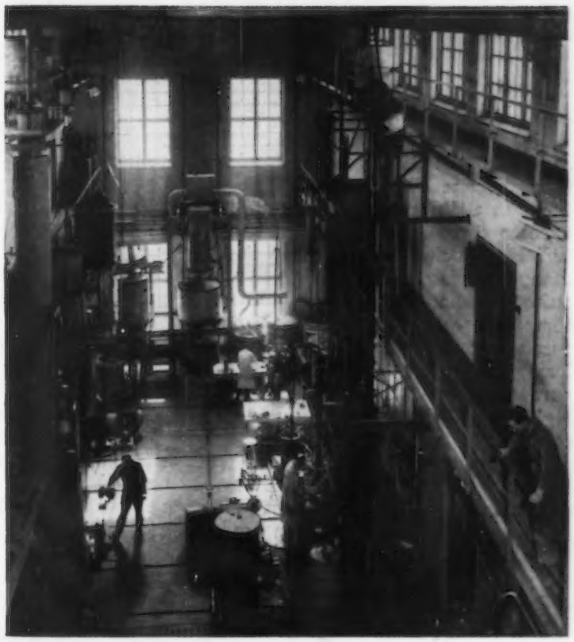
The paper mill has seven fourdrinier machines with conventional dryers and one Yankee machine. The newest machine is a modern high speed newsprint machine, incorporating all the latest developments, installed in 1956.

Roll wrapping is carried on in a central mechanized finishing room with automatic transportation of rolls from the paper machines to the wrapping machines and from these to storage and out to shipping. Rolls are stacked upright three high with clamp trucks and loaded into railway cars with overhead hoists.

Wood for the Kvarnsveden mill at the company's Tägten sorting station.

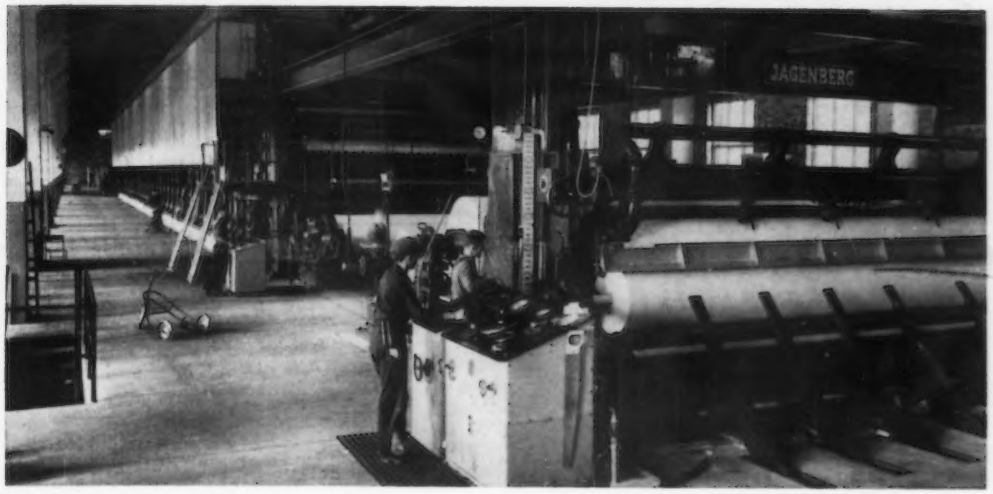


Voith continuous grinders in the main groundwood mill. The mechanical system for loading wood into the grinders was described in our April 20, 1959, issue.



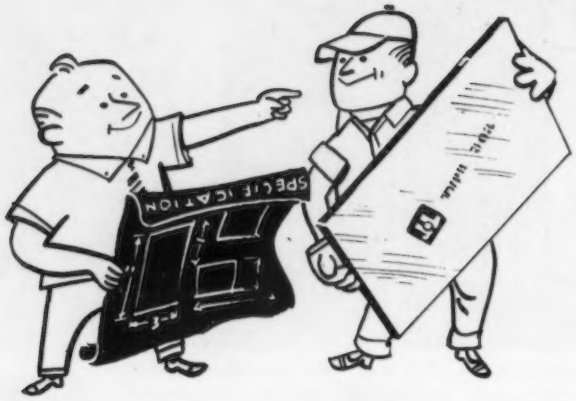
One of the experimental halls in Stora's central research laboratories at Falun. Here at the company's center for chemical research, in cooperation with the plants, processes such as the two-stage sulphite pulping system and the birch NSSC process were developed.

Dry end of the new number nine machine at the Kvarnsveden mill.



Selection and Care of Stainless Steel

Roland J. Berkol,
Technical Information Service,
Stainless and Strip Division,
Jones & Laughlin Steel Corp.



Be sure that the correct type of stainless steel is used.

Not all stainless steels are the same. Of the 39 or more standard types commercially available today, there is a difference in their resistance to corrosion from the raw materials and chemicals used in paper manufacturing. Pick the type best suited to handling your materials, temperatures and processes. If you receive more than one type of stainless steel in a single shipment, be sure the proper type is used in the right place. In general, austenitic stainless types in the 300 series are more widely used in paper mills than the 400 series. Type 302, which is the basic type in this series, satisfies many applications. For more corrosive applications Types 316 and 317 are used.

Handle Carefully

The higher brighter finishes are usually protected during shipment by a paper, plastic or other covering as specified. Retain the protective coating as long as possible during on-site fabrication and erection. If the covering must be removed, avoid scratching. Workers should avoid walking on the material. Avoid marring with steel tools. Scratches left unpolished may lead to pitting during service if corrosion conditions are severe. Stainless should be kept free of any foreign matter during fabrication and installation. When the protective covering is removed, see that it is removed completely.

Use stainless steel fasteners. Mild steel fasteners will rust.

Proper Design

Bacteria, fungi or particles of pulp can lodge and build up in crevices making complete cleaning a difficult task. Vessels, tanks and other processing equipment should be designed with smooth joins and round corners. If a corner cannot be formed and must be joined, rounding out the corner with a fillet of weld metal will provide for easier cleaning.

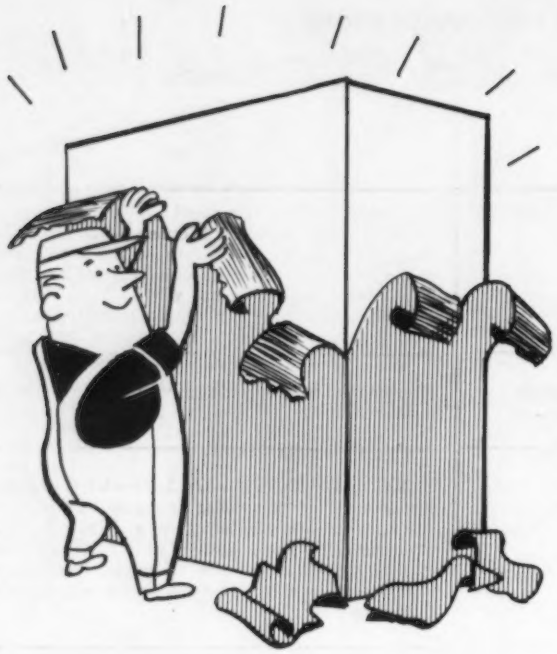
Other materials such as wood for platforms or galvanized steel for legs are sometimes used on stainless equipment. The use of any other material in combination with stainless should be carefully considered and designed. Carbon steel in contact with stainless will rust which may discolor the stainless surface. Wood will absorb liquids from spill-overs and, in contact with the stainless, pitting may develop.

It is a good rule always to use stainless steel fasteners of the same type as the equipment. Carbon steel nuts and bolts even though coated or plated will frequently rust in contact with stainless if any moisture is present as in paper mills. Materials that will not attack stainless will corrode ordinary steel bolts causing eventual failure. Design to avoid localized heating or over-heating. "Heat-tint" or discoloration is time-consuming to remove.

When stainless steel equipment is used in conjunction with electrical equipment, it should be grounded to

A REVIEW OF STAINLESS STEEL APPLICATIONS

Stainless Type	Composition % chromium	% nickel	other	Characteristics	Applications
302	17-19	8-10		General purpose "18-8"	Pulp washers, dump valves and stock piping; dandy roll wire; screen plates for knotters; decker or thickener wires; washer tanks; screens for kraft blow tanks; chemical recovery tanks; caustic bleaching tanks, covers, piping, pumps, valves, chutes, mixers, washers, screens in caustic bleaching stage.
303	17-19	8-10	P, S or Se	Free machining grade	Pump or valve parts requiring much threading, tapping or machining.
304	18-20	8-12	C, .08% max.	Welding grade for mildly corrosive conditions	Washer tanks; shells for kraft digesters; digester accessories if much welding is necessary. Caustic bleaching equipment, including covers, piping, pumps, valves, chutes, mixers, washers, screens. Beater tubs and liners. Stock chests, lines and tanks; flow boxes; head boxes; slices, saveall trays, piping, saveall, suction box covers.
304L	18-20	8-12	C, .03% max.	Welding grade for mildly corrosive conditions	Kraft digesters, or linings, welded tanks.
305	17-19	10-13		Low work hardening rate for cold forming	Dished or deep drawn pieces.
308	19-21	10-12	C, .08% max.	For welding rod use	Welding equipment made of types 302 and 304.
309 310	22-24 24-26	12-15 19-22		For high temperature, better corrosion resistance than type 304	High temperature heat transfer equipment, furnace parts.
316	16-18	10-14	Mo, C, .08% max.	Excellent corrosion resistance.	Sulphite mill equipment such as digesters, acid lines, circulating piping, digester relief system, pumps, blow pit accessories, valves, nozzles, pumps, pipe lines, gas recovery hoods, ductwork, butterfly valves, heat exchangers; some acid preparation and treating equipment; stacks and flues carrying corrosive gases. Equipment for handling dilute chlorine-containing white water.
316L	16-18	10-14	Mo, C, .03% max.	Excellent corrosion resistance, welding grade	Sulphite digesters, acid systems, bleached stock lines.
317	18-20	11-15	Mo, C, .08% max.	Maximum corrosion resistance in standard grades	Sulphite mill equipment such as digesters, acid lines, circulating piping, digester relief system, pumps; blow pit accessories; gas recovery hoods, ductwork, butterfly valves; heat exchangers; some acid preparation and treating equipment; lining for absorption towers, acid piping, fans; stacks and flues carrying corrosive gases. Bleach plant equipment such as, dump valves, stock piping for chlorinators if acid stock is handled; accessories and washers following hypochlorite bleaching.



Retain the protective coating as long as possible during installation but be sure to remove completely before starting equipment.

prevent galvanic action from stray currents.

When gaskets or packing are required, avoid graphitic types which tend to accelerate corrosion and pitting. Asbestos, nylon and other materials are available, which are satisfactory.

Before initial operation, be sure that all welds are smooth, that all undesirable scratches have been removed, that all traces of the protective covering and adhesive have been taken off and that all aids to fabrication have been cleaned off.

Periodic Cleaning

Stainless steel equipment should be cleaned regularly as required. For many applications, cleaning with hot water and soap, detergents or ammonia is sufficient. Ordinary washing should be followed by a fresh water rinse to remove traces of the cleaning solution. Decorative surfaces should be wiped dry to eliminate spotting.

Paper processing equipment should be checked frequently for the formation of deposits. The sooner a deposit is removed, the less chance there is of local pitting caused by a lack of oxygen. If liquid solutions are not effective, deposits should be removed at once with the finest abrasive that will do the job. Coarse scouring powders will scratch. Use stainless steel wool if necessary, but not regular steel wool. Iron particles from ordinary steel wool can become embedded in the surface and later rust. If stainless steel wool or sponges are not available and ordinary steel wool must be used, follow the steel wool cleaning with one of the household cleaners. This will help remove any loose iron particles.

Discoloration caused by heat can be removed with stainless steel wool or a fine abrasive.

Pay particular attention during cleaning to the surfaces around washers and gaskets.

Seasonal Cleaning

When stainless equipment is to be idle for any length of time, clean with extra care. Be sure that all deposits are removed. Be sure the system is thoroughly flushed out with water, and that no product or cleaning solution remains. If possible, dry out the system so that even water accumulations are removed.

What Makes Stainless Steel Stainless

Stainless steel is the name given any iron-chromium alloy which contains at least 11.5 per cent chromium. Most standard grades contain more than this, as well as nickel and other alloying elements such as molybdenum, manganese, etc. The chromium imparts all the basic corrosion resistance of the metal.

Current theory is that the stainless alloys form a thin, transparent and very tough oxide film which is passive—that is, practically inert. As wear or abuse causes damage to the surface, this film automatically restores itself on the new surface, provided oxygen is present. For this reason then, stainless offers outstanding resistance to corrosion by oxidizing solutions and heated air. For the same reason it offers considerably less corrosion resistance to reducing solutions or in conditions where the surface is seldom cleaned and oxygenless deposits are allowed to accumulate.

An example of how cleaning action, whether inherent to the application or part of a maintenance routine, helps the corrosion resistance of these alloys is found in marine parts. Stainless steel would not be recommended for a pier piling in still water because of a lack of oxygen. Yet, in the case of marine propellers, stainless steel offers better service than any other metal because the surfaces of the propeller receive oxygen from the constant washing action of water.

Brush on baking soda as quickly as possible after soldering to neutralize flux.

Open letter

to suppliers who serve the paper and pulp industry

Editorial pages can't do the whole job

Our readers have many information needs our editors can't fully serve.

You are reading this issue of PAPER TRADE JOURNAL because you want to know what's going on in the industry.

So are thousands of your customers and prospects.

Most mill readers—at least the ones I have a chance to talk to—say they read the JOURNAL for news, trends and practical ideas. Ask *why* they want this information and they'll say, in effect, "to do a better job." This can mean any improvement in any phase of a man's responsibilities—production or maintenance methods, record keeping, safety, materials handling—and certainly includes the purchase of materials, equipment and supplies needed to make an improvement effective.

Our editors report new and improved products as part of their coverage of news, but the point I'd like to make is that as editors they cannot possibly tell our readers all they'd like to know about the hundreds of products that are constantly under consideration for purchase. For example—*only you know the many specific advantages of your product that you'd like our readers to know about.*

This leaves an information vacuum in PAPER TRADE JOURNAL that can be filled only by suppliers in the form of advertisements.

By this definition an effective advertisement (for both your prospects and you) is basically information *wanted* by readers to help them make buying decisions that in turn enable them to "do a better job."

This may be a roundabout way to define what advertising is in our industry, but I'm putting it this way for a purpose: it sets the stage for the kind of information paper and pulp men want in ads and, therefore, suggests the kind of advertising that will be most effective for suppliers to run. More about this later.

George E. Lockwood PUBLISHER

PAPER TRADE JOURNAL

Manufacture and Use of Chlorine Dioxide in Pulp Bleaching

F. M. Ernest,
Assistant Manager,
Pulp & Paper Section,
Solvay Process Division,
Allied Chemical Corp.

Since the successful installation at Riegel Carolina Corp. in 1952 of a commercial chlorine dioxide manufacturing plant designed by engineers of the Solvay Process Division of Allied Chemical Corp., an important new chapter in pulp bleaching to high whiteness has been written. While a few mills in Europe and Canada had used chlorine dioxide to some extent since the end of World War II, certain drawbacks retarded the rapid acceptance of chlorine dioxide bleaching; i.e., **A,** secretive techniques maintained by the inventors; **B,** high royalties for patent rights; **C,** inefficient chemical utilization in the manufacture with accompanying high costs. The Solvay Process Division developed a safe, economical, and continuous method for producing chlorine dioxide and has given complete details of the process to the pulp and paper industry royalty-free.

Chlorine dioxide was discovered to be a distinct chemical compound by H. Davy in 1815 when he reacted potassium chlorate and sulfuric acid. In the reaction, it is assumed that chloric acid, $HClO_3$, is first formed:

$$KClO_3 + H_2SO_4 = KHSO_4 + HClO_3$$

and the chloric acid then decomposes to perchloric acid, $HClO_4$, and chlorine dioxide **(1)**:

$$3HClO_3 = HClO_4 + 2ClO_2 + H_2O$$

For a long time the chemistry and properties of chlorine dioxide were little understood because of the presence of chlorine in admixture with the chlorine dioxide.

Chlorine Dioxide Properties

Chlorine dioxide at ordinary temperatures and at concentrations considered safe for handling has an intense yellow color. It has a density of approximately 2.4, and a pungent, irritating odor. Compared with chlorine, its color is more intense and it is more irritating and toxic. The boiling point of liquified chlorine dioxide is 11°C., and its melting point is —59°C. **(2)** Strong concentrations of gaseous, liquid, or solid ClO_2 are reddish in color and may be violently explosive.

It is reported that the odor of chlorine dioxide is apparent at 14-17 p.p.m. and it is irritating to the mucous membranes at 45 p.p.m. Guinea pigs subjected to an atmosphere of 150 p.p.m. were dead in 45 minutes. **(3)** Continued exposure to even very dilute concentrations produces a logy, listless effect on the human body for at least 24 hours thereafter. However, there appears to be no cumulative effect due to repeated exposures to this gas. Once exposed to a strong chlorine dioxide atmosphere, a man can no longer detect the relative gas strength until he has been away from the contaminated area for several hours. Protection of the respiratory system may be achieved by utilization of chlorine type gas masks.

Pure gaseous chlorine dioxide decomposes at a measurable rate at temperatures above 30°C., and from 50°C. to 60°C. it decomposes explosively. Gas temperature is probably one of the most important factors in chlorine dioxide decompositions. Light, as well as contact with mercury, sulfur, grease, or other organic matter, or an electric spark, can cause the gas to explode. Gas concentrations below about 4 per cent by volume cannot be exploded by an electric spark. Concentrations in the range of about 4 per cent to 20 per cent by volume, when sparked, produce gas decompositions of a mild nature which are classified by the industry simply as "puffs."

Liquefied chlorine dioxide is so dangerous to handle that no attempt should be made to prepare it except in carefully controlled laboratory experiments by experienced technical personnel. Water solutions should be run to sewers only when plenty of diluting water or alkali is present.

Laboratory Preparation

In the laboratory ClO_2 is easily prepared from acidified solutions of sodium chlorite or by the reaction of potassium chlorate, sulfuric acid, and oxalic acid. We prefer the latter method because of the ease of preparing relatively strong solutions and the ease of control of the reaction. All laboratory equipment is Pyrex glass with standard taper, interchangeable joints with the exception of the joint between the trap and the tubing leading to the receiving bottle The equipment should be shielded by a safety glass screen.

To produce ClO_2, 160g. of $KClO_3$ or 139g. $NaClO_3$ and 133g. of crystalline oxalic acid are mixed in the reaction flask. Added to this are 333 ml. of a solution in the proportion 120 ml. concentrated H_2SO_4 and 400 ml. of distilled H_2O. The equipment is assembled taking care to moisten the ground glass joints with distilled water.

The trap should contain sufficient distilled water to cover the end of the down-coming tube. Water volume consideration should be exercised to prevent suck back into the reaction flask in case of a heating failure. The distilled water in the ClO_2 receiver should be pre-cooled with ice water. The trap is maintained at room temperature.

With all equipment connections ready and the receiver immersed in an ice bath, the reaction is started by immersing the reaction flask in a 60°C. water bath. The bulk of the reaction will occur in ½ to 1 hour. A caution is required in that an explosion may occur if reaction temperature is allowed to rise to 100°C. The CO_2 produced by the decomposition of oxalic acid dilutes the ClO_2 so that no explosion occurs in the

Based on a paper presented to the Pulp Technology Class at the University of Maine, January 6, 1959.

gas phase in the absence of direct sunlight. The gases pass through the trap where traces of H_2SO_4, HCl_2 and Cl_2 are removed and then to the receiving bottle where ClO_2 is dissolved. We normally prepare ClO_2 solutions at 18-22 g.p.l. concentration.

At the conclusion of the run, the heat is removed from the reaction flask by removing the water bath. The receiving bottle may contain liquid chlorine dioxide octahydrate which may be readily redissolved upon warming.

Laboratory ClO_2 is stored in a glass-stoppered bottle in the refrigerator to minimize ClO_2 loss and the decomposition to Cl_2 and O_2.

To analyze the chlorine dioxide-chlorine mixtures which are produced in nearly every known method, the ClO_2 is absorbed in potassium iodide. Water solutions are pipetted directly into the KI buffered with small amount of sodium bicarbonate. The tip of the pipette is held below the surface of solution. An amber color results.

The determination of ClO_2 and Cl_2 is based on the fact that in a neutral potassium iodide solution all of the chlorine and one-fiifth of the ClO_2 titrates with sodium thiosulfate according to the equations (4):

$$Cl_2 + 2KI = 2KCl + I_2$$
$$2ClO_2 + 2KI = 2KClO_2 + I_2$$

Then upon acidification of the solution, the remaining four-fifths of the ClO_2 will titrate as follows:

$$4KI + KClO_2 + 2H_2SO_4 = KCl + 2H_2O_4 + 2K_2SO_4 + 2I_2$$

First, the neutral ClO_2 solution in KI is titrated with N/10 thiosulphate to a colorless end point. The volume of the thiosulphate used is recorded as the neutral titration. After acidification with 25 ml. of normal H_2SO_4, the titration is continued to the usual starch end point. The total titre is recorded and the concentration of ClO_2 calculated:

A = Neutral titre in ml. N/10 sodium thio for all Cl_2 and 1/5 ClO_2
B = Total titre in ml. N/10 sodium thio for all Cl_2 and all ClO_2
B-A = ml. thio for 4/5 of ClO_2
(B-A) 5/4 × 0.001349 = g ClO_2
[B — 5/4(B-A)] × 0.00355 = g Cl_2

$$\text{g. } Cl_2 \times \frac{1000}{\text{ml. sample}} = \text{g.p.l. } Cl_2$$

$$\text{g. } ClO_2 \times \frac{1000}{\text{ml. sample}} = \text{g.p.l. } ClO_2$$

To reduce the hazardous characteristics of the gas, ClO_2 is necessarily produced under conditions where it is always diluted with air or an inert gas. If the partial pressure of chlorine dioxide in the gas-air mixture exceeds 76 mm. (about 10 per cent by volume), the mixture may explode or puff on exposure to heat, light, or an electric spark. Gas concentrations should, therefore, be held below 76 mm. partial pressure or about 10 per cent by volume.

To analyze gas samples of ClO_2, the same titrations and calculations are utilized. A known volume of gas is collected in a calibrated gas sampling bottle and aspirated slowly into KI solution by means of a frittered glass absorption bottle.

The partial pressure of ClO_2 is then determined by the calculation:

$$\text{g.p.l. } ClO_2 \times \frac{22.4}{67.5} \times \frac{273 + t°C}{273} \times \text{mm. Hg}$$

and the per cent ClO_2 in the gas phase by the calculation:

$$\text{g.p.l. } ClO_2 \times \frac{22.4}{67.5} \times \frac{273 + t°F}{273} \times 100$$

Actually in practical operation a nomograph has been prepared to aid the operators with the calculations upon which control of commercial units are based.

Solvay Process

Chlorine dioxide's unique property of bleaching cellulose to very high brightnesses with little if any degradation has been recognized for some time. However, the explosive character of the pure material has tended to discourage wide spread use in this field until methods of manufacture were developed that reduced the hazard. The practice has been established of generating chlorine dioxide at the place of consumption, i.e., a pulp mill.

At the present time there are two widely used industrial processes for manufacturing chlorine dioxide on this continent and are known as the Solvay and Mathieson processes.

The production of chlorine dioxide by the Solvay process is accomplished by the reaction of sodium chlorate solution, sulphuric acid, and methyl alcohol with subsequent absorption of chlorine dioxide gas in water. The chlorine dioxide water solution can be stored safely and used as required.

Physically, the plant consists of two reactors, each being a flooded vessel which provides ample retention time of the chemicals for the completion of the reaction. The reactors are constructed of steel, lined with homogenously bonded chemical lead, or glass, and are water jacketed for temperature control.

In normal operation crystalline sodium chlorate is received at the mill in tank cars holding 40 to 50 tons. It is dissolved by the introduction and recirculation of hot water of sufficient volume to produce a solution of 46 per cent concentration. Storage facilities are provided with recirculation piping through the unloading pumps for adequate mixing and solution. Steam coils are also generally considered a necessary facility of the storage tank. Some mills provide storage capacity separate from an unloading tank where sodium chlorate is brought to the 46 per cent contration before pumping in to storage.

Materials of construction for handling $NaClO_3$ are a matter of mill preference and economics. Many mild steel tanks 5/8-inches thick have been installed. Corrosion, however, occurs at the air-liquid interface and leakage generally develops within 3-4 years. Stainless steel or stainless steel-clad storage tanks are excellent but expensive. Aluminum has been used but must be thoroughly grounded to prevent electrolytic corrosion. Gunite, paints and plastics have been used to some extent on mild steel and only time will show how well these hold up. However, since application techniques are so important in the latter two applications, it is doubtful if they will ever be a replacement for stainless steel.

Storage tanks are also provided at the pulp mills for shipments of methanol and sulphuric acid. Materials of construction for both are well known. Methanol is handled in iron equipment since it is a very pure non-corrosive compound. Sulphuric acid is purchased as 66°Be. or 60°Be. H_2SO_4. The process utilizes 60°Be. H_2SO_4 and consequently if a savings can be made by the purchase of the former, it must be diluted. Purchased acid is generally always handled in welded extra heavy iron piping and with special pumps having mechanical seals. Tank cars of sulphuric acid may be unloaded with air pressure. Dilution of 66°Be. H_2SO_4 requires a heat exchanger and special materials of construction because of the heat generated and the possibility of passing extremely corrosive, hot H_2SO_4 at concentrations below 60°Be. Glass, Karbate, and Saran lined steel are used extensively.

Not only is chlorine dioxide a hazardous compound but each of the raw materials if not handled properly can present certain difficulties. Methenol, of course, is highly poisonous and will burn if sparked or ignited. Most insurance companies require a flame arrester on and dykes around storage tanks. Pure, dry sodium chlorate is

relatively inert. However, if the solution is absorbed by organic materials, i.e., wood, shoes, clothing, or the ground, and allowed to dry, slight friction may cause the material to burst into flame simulating the head of a match. All spillage therefore must be thoroughly flushed or washed away with large volumes of water, and personnel using equipment handling $NaClO_3$ should wear rubber clothing. Several serious burns have resulted in not complying with handling instructions.

The sodium chlorate, 60°Be. sulphuric acid, and methanol flow by gravity from head tanks or are pumped through the nozzles inserted into the bottom of the first reactor of the Solvay system. Careful chemical metering is required. Air is introduced into the bottom of each reactor to provide adequate mixing of the chemicals, stripping of the ClO_2 gas from the reactor liquor, and maintenance of the ClO_2 concentration of about 10 per cent volume in the exit gas stream. The temperature of the liquor is maintained at 130-135°F. by heat transfer through the water jacket. Chemical and air nozzles are fabricated of PVC or preferably titanium. The ClO_2 generating solution is extremely corrosive and piping to generator must be resistant where there is any contact.

The reduced acidified chlorate solution continuously overflows by gravity from the primary reactor into the secondary through Saran-lined steel piping at a rate corresponding to the chemical input. Additional methanol is introduced at the bottom of No. 2 reactor for the completion of the chlorate reduction. A small amount (about 10 per cent) of the total acid required is also diverted into the bottom of this reactor to maintain an optimum acidity level. Air is again provided for mixing, stripping and dilution. The temperature of the reactor is maintained at about 140 to 145°F by hot water in the jacket.

The overall chemical reaction which occurs may best be approximated by the following equation:

$$4NaClO_3 + 4H_2SO_4 + CH_3OH = 4ClO_2 + HCOOH + 4NaHSO_4 + 3H_2O$$

A small amount of chlorine, two to four per cent is produced as a by-product. An important advantage of the Solvay method is that large variations in methanol feed rate can be tolerated with no hazardous reaction as occurs in other processes.

Reaction efficiency for the production of ClO_2 is reported by operating mills to be up to 90 per cent plus. Chemical efficiency or yield is calculated by dividing the ClO_2 by the ClO_2 equivalent of the $NaClO_3$ used.

Chemical feed piping, overflow piping, and gas piping are so connected that either reactor can be isolated for maintenance without halting production in the other. This is a very important consideration in a large bleach plant, since either reactor will produce the rated capacity of the generating plant at a reduced efficiency level and bleach plant operation can be continuously maintained.

The chlorine dioxide gas is absorbed in water by countercurrent flow through a packed absorption tower at a concentration of 6-12 g.p.l. Gas piping is glass-lined steel or Saran-lined steel. The absorber may be constructed of chemical stoneware sections or steel, polyvinyl chloride membrane-lined and covered with acid-proof brick and cement. It is packed with one-inch Intalox or Berl saddles. The chlorine dioxide solution flows from the bottom of the absorber by gravity to a large brick or glass-lined storage tank from which it is pumped to the bleach plant. The temperature of the water for ClO_2 absorption is maintained at about 40°F. or below by mechanical or steam jet refrigeration as required for efficient absorption.

The spent liquor from the secondary reactor, containing sulphuric acid, sodium bisulphate, and a very small amount of sodium chlorate can be used for the treatment of black liquor soaps in tall oil recovery and subsequently burned in the recovery furnace of a kraft mill as a salt cake substitute.

Operation of the plant is at most a one-man job. Oftentimes the operator can assume other duties in addition to the ClO_2 plant since periodic sampling and analysis of the ClO_2 gas and solutions as well as instrumental control comprise his total efforts. The process is operated remotely on a continuous basis from a small panel in a centrally located instrument room. Start-up and shutdown of the unit is extremely simple and rapid requiring not more than 5 minutes.

Puffs which do occur from ClO_2 decompositions are automatically pressure released to the atmosphere by spring loaded relief seals. The latter are designed to relieve excessive pressures as protection of the equipment at 2 psig. If a puff occurs, it is necessary to stop the generation of ClO_2 because the decomposition will continue as long as ClO_2 is evolved. This is due to the heat of decomposition making the reaction self sustaining. As soon as the gas temperature returns to normal—about 15 minutes—the process is started up again. Practically all puffs or decompositions occur in the gas phase.

Mathieson Process

In the Mathieson process, like the earlier batch operated Holst Process, a sulphuric acid-sodium chlorate solution is reduced with SO_2 with the formation of principally chlorine dioxide and small quantities of hydrogen chloride and chlorine—two to five per cent by volume of the produced gas. The Mathieson process is continuous in operation. The reaction is typically carried out in a lead-lined vessel of much larger capacity—eight ft. diameter as compared with Solvay's two reactors at three ft. diameter each. Temperature is controlled at 90°F. by cooling water in the jacket. Four inlets admit air containing SO_2. Mixing and ClO_2 dilution is accomplished through special Aloxite sparger plates. Four draft tubes of chemical stoneware mounted within the vessel, over the spargers, provide Mommoth pump type internal circulation.

SO_2 for the process may be purchased as a liquid and subsequently passed through vaporization equipment or it may be obtained from specially designed molten sulphur handling and burning facilities. Liquid sulphur dioxide is shipped in tank cars, ton containers, and cylinders. All containers are handled under regulations of the Interstate Commerce Commission which classifies sulphur dioxide as a nonflammable, compressed gas. Purchasers of tank cars of liquid sulphur dioxide are required to transfer shipments into their own pressure storage vessels. Liquid SO_2, while much more expensive than burner gas, actually produces ClO_2 for less money than the latter because of inherent difficulties with control for burning small quantities of sulphur.

Sulphur dioxide presents a potential hazard since it is an irritating, asphyxiant gas. Leaks in handling equipment must be promptly repaired. The irritation of SO_2 is so strong that men cannot stand to remain in contaminated areas without adequate gas mask protection.

Control of the SO_2 process is important because of the necessity of reacting all of the SO_2 bubbles before they reach the surface of the liquid in the reaction vessel. Escaping SO_2 will react violently with chlorine dioxide. Operating pulp mills report 83 and 90 per cent efficiency for conversion of sodium chlorate to ClO_2 when burner gas SO_2 and liquid SO_2 are used respectively.

Capital costs for the installation of the three-ton capacity Solvay and the Mathieson liquid SO_2 units are of about the same order of magnitude $150-250,000 depending upon instrumentation and refrigeration unit. A molten sulphur storage, handling and burning facility may cost from $35-50,000. Chemical costs for producing ClO_2 range from 16-25 cents/lb. depending on reducing agent, efficiency and credit allowed for salt cake and acid by-product. Total production costs are generally 20 to 28 cents per lb.

Day-Kesting Process

From chemical engineering and manufacturing cost considerations, a third method, the Day-Kesting Process, is novel and provides an interesting approach. This process was developed simultaneously by G. A. Day of the Brown Co. and E. E. Kesting of Germany and consists of a cyclic operation which combines the usual electrolytic sodium chlorate production with the chemical process for conversion of the sodium chlorate to chlorine and chlorine dioxide by reduction with hydrochloric acid (5) according to the chemical reactions:

$$NaClO_3 + 2HCl = ClO_2 + 1/2Cl_2 + NaCl + H_2O$$

$$NaClO_3 + 6HCl = 3Cl_2 + NaCl + 3H_2O$$

Spent brine solution containing both sodium chloride and sodium chlorate from the reactors is vacuum flush cooled for concentration before recycle to the cells. A battery of chlorate cells is required, each cell being 4 ft. x 9 ft. x 3 ft. They have graphite anodes and steel cathodes. The cells are operated at 105°F. A selenium rectifier applies 3 volt, d.c. current across each cell. Current efficiency for the operation is reported to be about 80 per cent for the 10,000 ampere cells. Cell liquor containing 400 gpl. $NaClO_3$ and 90 gpl. NaCl is placed in storage for use in the ClO_2 operation. Sometimes chromate is added to the brine for corrosion protection of electrolytic facilities.

The advantages of this phase of the operation are the economies claimed over purchased chlorate achieved by the absence of evaporation and drying, and also savings on freight transporation of solid material. The disadvantages are that an electrolytic operation, to be efficient, must be operated uniformly, continuously, and at near full production capacity. Low cost power must be available.

Brine, filtered for the removal of carbon and other impurities which may adversely affect ClO_2 production, is metered with hydrochloric acid (70°Be.) into the first of six series connected cascade reactors. An excess of $NaClO_3$ is always present. Each reactor is approximately four ft. in diameter by five ft. high. Steam is added to the fifth and sixth units in the series to complete the reaction and remove ClO_2 countercurrent to liquid flow. Air, added to the 4th reactor, provides ClO_2 dilution for safety. Reaction temperatures are from 95°F. to 212°F. and depend largely on the amount of steam utilized. The exit gas contains approximately 10 per cent each of ClO_2 and Cl_2 and 80 per cent air. The ClO_2 and Cl_2 are separated at 90-95 per cent efficiency in a countercurrent water absorption unit. ClO_2 solution is reportedly produced at 3-5 g.p.l. Hydrogen produced in the electrolytic cells may be vented to atmosphere or burned with chlorine to form the HCl requirement of process.

The major disadvantages of the Day-Kesting process are its high capital and maintenance costs. Reasonable capital estimates for a plant to produce three tons of ClO_2 per day are conflicting but have been reported to range from 0.7 to 1.0 million dollars. This is partially offset by low production cost claims of 13 to 15 cents per pound of ClO_2. Typical materials of construction, i.e., poly-vinyl chloride, armored stoneware, etc., have been utilized but high temperature operation has multipled the handling problems.

Pulp Bleaching

Chlorine dioxide solution is pumped to the bleach plant by means of a mechanically-sealed pump. Piping is Saranlined steel, glass or unplasticized poly-vinyl chloride.

To date there have been two widely accepted processes for applying chlorine dioxide to semi-bleached pulp.

One design incorporates an up-flow pre-retention tube usually four to five ft. in diameter with the stock spilling over into a down-flow tower. Total stock retention time requirements of three to five hours necessitates very large towers for high tonnage mills. Bleaching consistencies are 12-16 per cent and temperatures of 150-180°F. are utilized. Auxiliary equipment include steam mixer, thick stock pump, chlorine dioxide mixer, dilution nozzles in the base of the tower, and a washer. Hasteloy C has been most often used for the ClO_2 mixer although one unit now in service made with a titanium lining has shown excellent resistance to corrosion. Hasteloy C linings generally have failed in one to three years. The up-draft tube and bleach tower are acid-proof brick lined. Piping and washer are generally 316 or 317 stainless steel.

This unit which is the more widely used design offers considerable flexibility in operation in that stock retention times can be varied to suit requirements. The shut-down of previous bleaching stages does not mean retarded pulp drier or paper machine operation since stock can continue to be withdrawn from the tower for several hours. Extremely uniform pulp is produced. ClO_2 is mixed with the pulp under pressure where the tendency for gas to flash off is the highest. At the end of the bleaching period where concentrations of ClO_2 are low, pressure is again applied for efficient bleaching. SO_2 or caustic soda is added in the dilution water to protect stainless steel equipment from ClO_2 attack.

The other ClO_2 bleach facility is an up-flow tower with a top launder ring into which the stock overflows and is diluted. Chlorine dioxide is mixed into the stock by means of a "radial mixer" mounted in the cone-shaped base of the tower. Stock from the hypo washer at about 11 per cent consistency passes down through a steam mixer and into a star-type feeder. Consistencies higher than 11 per cent have given motor trouble with the radial mixer. Air or steam pressure applied in the down-stream leg moves the stock through the tower. Lever control in the down leg is maintained by electronic equipment. Residual ClO_2 is neutralized by application of caustic soda spray on top of the tower. The advantage of this equipment which has been claimed is control of bleached brightness with no channeling effect.

The retention time in the up-flow tower cannot be economically varied nor can this tower be utilized as surge capacity.

Because of its size and specialized materials of construction, a chlorine dioxide stage for a bleach plant generally costs from ¾ to 1¼ million dollars. Usually mills smaller than 75-100 tons per day cannot economically afford ClO_2 bleaching.

Chlorine dioxide bleaching has been applied to kraft, both papermaking and dissolving grades, to sulphite, both papermaking and dissolving to soda, and to neutral sulphite semi-chemical pulp. Typical bleaching conditions for all are identical, i.e., high consistency (11 to 16 per cent), high temperature, (140-180°F.) stock retention time of three to five hours and an acid pH (three to five). Controlled tests have shown that the

best pH for ClO_2 bleaching is 4.5. However, no physical deleterious effects are observed at pH values below this level. Since hydrochloric acid results from ClO_2 reaction with pulps, the pH during bleaching drops from the neutral range to the above mentioned values. Tests have shown that about 70 per cent of the ClO_2 applied is consumed during the first 20 to 25 minutes but that mixiumum bleaching efficiency is achieved only by the five-hour retention time.

Chlorine dioxide bleaching has been applied to kraft pulp in many sequences, the most successful and common of which are:

	Max. Brightness
1. C-E-H-D	86-88% G.E.
2. C-H-D	85-87%
3. C-E-D-E-D	88-91%
4. C-E-D-D	88-90%
5. C-E-H-E-D	86-88%
6. C-E-H-H-D	86-88%
7. C-E-H-D-E-D	88-90%
8. C-E-H-D-P	88-91%

On sulphite pulps very high brightness levels (90+ per cent) have been achieved commercially by utilization of C-E-H-D.

Soda pulps are very difficult to bleach to the high brightness levels; however, the following two sequences are used to achieve 86-89 per cent G.E. colors.

1. C-E-H-D
2. C-E-H-D-D

Ninety plus per cent G.E. Brightnesses are possible on soda pulp at slightly higher cost than the above mentioned sequences.

Chlorine dioxide bleaching of neutral sulphite semi-chemical pulps has not yet been extensive since hypochlorite easily and cheaply produces 85-86 per cent G. E. Brightness in three or four stages.

One of the most important and yet most often over-looked facility in ClO_2 bleaching is the necessity for an extremely good water quality and quantity. Last stage chlorine dioxide bleaching utilizes fresh water for dilution and the washer showers. Colored contaminants in the water tend to lower the maximum brightness level attainable with ClO_2. We generally figure bleach plant designs to include 30-40,000 gallons of fresh water per ton of pulp. This water must meet the following specifications for good results:

Color—Pt-Co . . Not over 5 p.p.m.
Fe . . Not over 0.1 p.p.m.
Mn . . Not over 0.05 p.p.m.

Of lesser importance turbidity should be not over 5 p.p.m. and the pH should be 7.0 to 7.2. Strict requirements such as these necessitate water treatment plants larger than those of many cities. A large pulp mill often handles 15-20 million gallons per day.

The chemical cost for bleaching with chlorine dioxide can easily be determined from the actual manufacturing costs and the per cent utilized on the pulp. With four-stage bleaching, the final stage being chlorine dioxide, it is shown that the ClO_2 chemical bleaching cost is about $3 per ton. The use of two stages of chlorine dioxide on kraft pulp is actually only slightly more expensive than hypochlorite and one stage of ClO_2. Assuming 2 per cent NaOCl and 0.6 ClO_2, the usual consumptions, a cost of about $5.80 is calculated whereas two stages of ClO_2 will require about 1.2 per cent at a cost of $6.00 per ton.

To summarize briefly the advantages of ClO_2 bleaching are:

1. High brightness without loss of strength.
2. Low brightness reversion.
3. Cleanliness-specific for wood dirt and shives.
4. Bluish color of pulp instead of hypo yellow.
5. Brightness control or leveling out.
6. Easier to run ClO_2 bleached pulp on paper machines.

REFERENCES

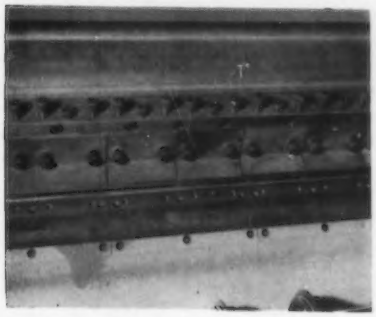
1. Mellor, J. W., 1922—**A Comprehensive Treatise on Inorganic and Theoretical Chemistry,** Vol II, pp. 286-7.
2. King, F. E., and Partington, J. R., **J. Chem. Soc.** 925-29 (1926)
3. Taylor, M. C., et al, **Ind. Eng. Chem.,** 32, 901 (1940)
4. Woodward, E. R., Petroe, G. A., and Vincent, G. P. **Trans. Am. Inst. Chem. Engrs.** 40, 271-90 (1944)
5. Kesting, E. **Tappi** 36, No. 4:166 (April 1953)

brake of the Weston roller ratchet type; fool-proof upper limit switch

PJT NEW EQUIPMENT & SUPPLIES

Perforator For Roll Tissue, Toweling

A perforating head that produces a slit-score tear-off perforation on roll toilet tissue and toweling, has



been developed by Dietz Machine Works, makers of paper converting equipment.

The "Slit-Score" unit, which can be installed on any make of toilet and towel roll machines, makes use of solid, quickly interchangeable blades that are mounted in the bed-roll for maximum protection. These blades are set at an angle to the anvil blades to minimize wear and keep drive power requirements at a minimum.

The anvil blades are mounted in a fixed position and pivot on a fulcrun during operation. This is said to eliminate the need for flexing blades.

Rapid disengagement of the entire perforating head is accomplished by means of air cylinders.

Full details on the "Slit-Score" perforating head are available from Dietz Machine Works, Inc., 126 W. Fontaine Street, Philadelphia 22, Pa.

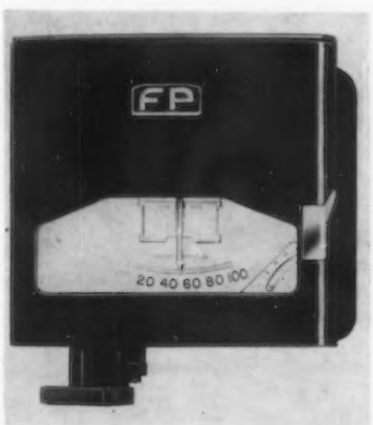
Dual Motor Vibrator Has Noiseless Operation

Cleveland Vibrator Co., Cleveland, Ohio, announces production of a dual motor vibrator geared for synchronous action. Model RC2-50 produces straight line vibration, in any direction. This unit operates on a rotating eccentric weight principle and features adjustable eccentrics, permitting force of vibration to be varied without changing weights. There are four weights, two on each motor, contra-rotating. Variable impact range is from 640 to 2200 pounds and any impact change can be made in a matter of minutes. Because there are no pulleys or belts within this totally enclosed vibrator, operation is practically noiseless, adds the manufacturer. Specifications include: weight, 100 pounds; dimensions: width 12⅝ inches; length 12 and five-sixteenths inches, and thickness 7⅛ inches. Input is 1000 watts, and Model RC-31 is obtainable for 220 volt, d.c., 3-phase, 60-cycle power.

Transmitter Converts Motion to DC Signals

A fully transistorized instrument for converting motion to d.c. signals has just been introduced by Fischer & Porter Co. The Compatible Electronic Transmitter converts motion outputs from all F&P flow, pressure, temperature and level primaries to electrical signals compatible with all miniature electronic instruments.

Output may be 1 to 5 milliamps d.c. into load of 0 to 6000 ohms, 4 to 20 milliamps d.c. into load of 0 to 1500 ohms, or 10 to 50 milliamps d.c. into load of 0 to 600 ohms. The load may be any value between the limits indicated without the addition of external resistance. Printed wiring cards permit changes to be made in the field. The transmitter is suitable for operation in ambient temperatures from -20° to 150°F.; process fluid temperatures is ± 1 per cent of full scale for calibrated transmitters (± 2 per cent uncalibrated). For more information, write Fischer & Porter Co., 142 Jacksonville Road, Hatboro, Pa.



Stainless Steel Trap Magnetically Actuated

A power-operated, magnetically actuated compressed air trap, manufactured of stainless steel parts to resist corrosive gases or liquids, has been introduced by Hankison Corp. The trap is designated Model 501SS "Mag-Pneu-Power" Trap and has been especially developed for applications where brass and copper cannot be used. Completely automatic condensate discharge is assured by the trap's "power operation." This "power operation" uses the pressure

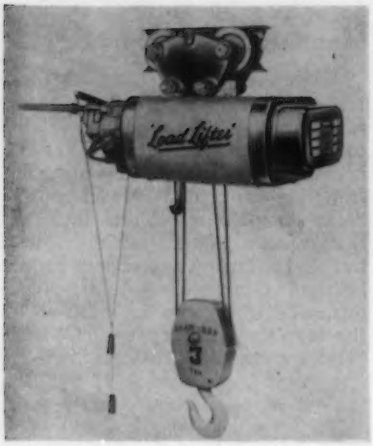
energy already available in the pneumatic system to open and snapshut the trap discharge valve. Snap-action opening and closing is possible, even at very low pressures.

The Model 501SS "Mag-Pneu-Power" Trap operates in a pressure range from 10-200 p.s.i.g. The overall height is 8½ inches and the normal shipping weight is 9 pounds. Complete details on the new stainless steel model can be found in Bulletin 501SS which is available from Hankison Corp., College & Pike, Canonsburg, Pa.

Heavy Duty Hoist Air Operated

A line of heavy duty, cable type, air-operated hoists known as Series "700" 'Load Lifter' Air Hoists has been announced Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc., Muskegon, Mich. The line includes a selection of sizes from 1 through 15 tons capacity, with choice of lifts and suspensions.

Some of the important operating advantages are: infinitely variable lifting speeds from a mere



creep to full rated speed; one-hand pendant control cord for accurate load control; motor replacements are practically eliminated because they cannot burn out from overloads, the motor merely slows or stalls; hoist can be completely serviced while suspended in the air.

Construction features claimed by the manufacturer: main suspension frame is a steel weldment; drum and sheaves are extra large diameter, for long cable life; lower block totally enclosed for safe handling; helical load gearing with ball bearings throughout; positive acting load brake of the Weston roller ratchet type; fool-proof upper limit switch to prevent over-travel of lower block; five-cylinder, radial, piston-type air motor with overlap of power impulses for even torque at all speeds.

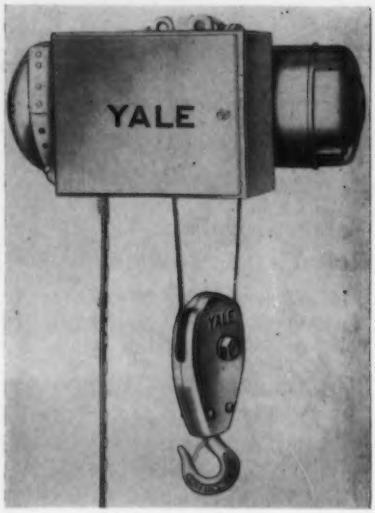
Standard suspensions are lug type, push type trolley, and hand geared trolley. Motor-driven trolleys are available on special application. For further information, write for Bulletin No. 15005-9-59.

Constant Speed Control For Electric Hoists

An a.c. electric hoist control, the Selectron, has been designed by Yale Materials Handling Div., The Yale & Towne Mfg. Co. to permit operation of hoists from slow creep to full speed under no load or full load at near absolutely constant speeds.

Heart of the system is a squirrel cage motor in conjunction with conventional control components which are easily replaceable and require no involved presetting to obtain optimum performance. The compact control unit requires no secondary controls, accelerating relays or load resistors, thereby eliminating any problems of dissipating heat.

The Yale Selectron control operates through five speeds under constant



positive control of the hoist operator. For maximum handling safety, the Selectron is designed for use with a mechanical load brake. The motor must deliver power to lower the load. If for any reason this power is cut off with a load suspended, the brake automatically takes over to hold the load and permits lowering with complete safety.

(Continued on page 55)

MAGNUS VALVES

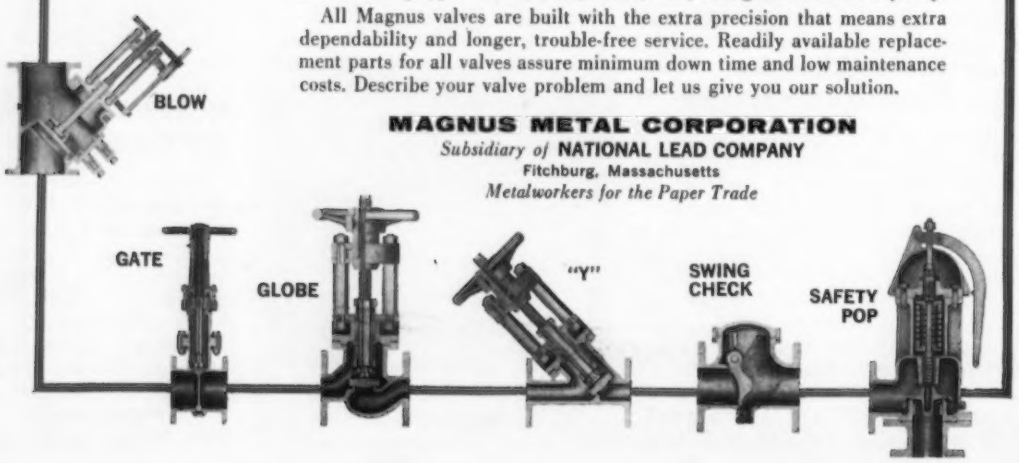
offer you

Extra Precision and Extra Performance for EVERY PAPER MILL JOB

For more than 50 years Magnus Metal has been specializing in custom-built valves for the paper-making industry. These valves are designed and built to meet your exact requirements, whatever they may be — for any of the following types: Blow, Gate, Globe, "Y", Swing Check or Safety Pop.

All Magnus valves are built with the extra precision that means extra dependability and longer, trouble-free service. Readily available replacement parts for all valves assure minimum down time and low maintenance costs. Describe your valve problem and let us give you our solution.

MAGNUS METAL CORPORATION
Subsidiary of **NATIONAL LEAD COMPANY**
Fitchburg, Massachusetts
Metalworkers for the Paper Trade



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for business... felts by Huyck

THE Huyck-Smyth Porosity Tester, being used above, is the *only* practical instrument available to measure porosity of running felts. This device . . .

- **determines when cleaning is needed**
- **evaluates performance of cleaning equipment and other machine components**
- **locates filled or plugged streaks**
- **improves water removal**
- **reduces steam consumption**

It is the most important advance in measuring on-machine felt performance since the development of the Huyckmeter.

Originated by T. C. Smyth of Crown Zellerbach and further developed by Huyck, the Huyck-Smyth Porosity Tester is now available to aid the entire paper industry.

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IDEAL COMBINATION

Prices of Fibers

NEW EQUIPMENT

(Continued from page 52)

Hose Coupling Is Automatic

An automatic coupling device has been announced by Lincoln Engineering Co., St. Louis. Called the

Flex-O-Matic Coupling, the product is offered in four sizes, for ¼ inch, ⅜ inch, ½ inch, and ¾ inch I.D. hose.

No tools are required to couple or uncouple Flex-O-Matic Couplings. A straight push connects the plug, locking it firmly in the socket regardless of air pressure. A slight pull on the knurled sleeve disconnects socket and plug, automatically shutting off air. A precision-fitted seal prevents leakage, and swivel action of the plug in the socket prevents kinking of the hose. Air passage through the new coupling is unrestricted.

Copies of the Air Supply Line Accessories Bulletin 227 are available upon request from Lincoln Engineering Co., 4010 Goodfellow Blvd., St. Louis 20, Mo.

Curing Agent and Seal For Concrete Floors

A combination curing agent and seal for new concrete floors, tradenamed Tremcrete, has been announced by The Tremco Manufacturing Co., Cleveland and Toronto. Tremcrete eliminates constant wetting down of concrete during the curing stage.

In one application, this product is said to provide a high degree of water retention in the concrete while the proper cure takes place. Also, it exhibits superior abrasion resistance while the building is being completed and for some time after; it resists dusting, solvents and alkalis. Tremcrete permits application of paint, linoleum, asphalt tile, etc., directly on the floor as soon as construction is finished.

Applied to new concrete floors 10 to 12 hours after final troweling it dries to tack-free stage in two to three hours. A data sheet is available from The Tremco Manufacturing Co., 10701 Shaker Boulevard, Cleveland 4, Ohio.

Liquid Moisture-Proofs Electrical Equipment

The harmful effects of moisture in electrical equipment may be eliminated by the application of CRC Moisture Inhibitor, a chemical liquid which drives out absorbed moisture and keeps it out. CRC eliminates the effect of wicking and reduces electrical failures.

Even equipment that has been totally submerged is soon in operating condition. Although CRC is nonconducting, it does not interfere with conductivity of contacts or commutators. In addition, it is said that CRC prevents corrosion of ferrous and non-ferrous metals with a long lasting, continuous, molecular film that completely blankets the surface. Because of its extremely low surface tension, CRC penetrates deeply into every crack and irregularity to seal out air and vapor, thus preventing corrosive agents from getting to the metal surface. CRC also facilitates cleaning rust, scale and dirt.

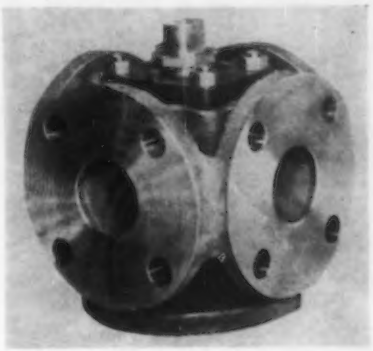
CRC protection is accomplished by total immersion, by pouring, brushing or spraying. Under most conditions one application will provide full protection for at least a year. Hygienic tests have proved that it is safe to use and is non-toxic to humans. CRC is packaged in 55-gallon drums, 1-gallon and 1-quart cans, and in 12-ounce aerosol cans. For complete technical data write Corrosion Reaction Consultants, Inc., 116 Chestnut Street, Philadelphia 6, Pa.

Plug Valves With Teflon Sleeves

A line of four- and five-port Tufline stainless steel plug valves, suited for a wide range of services, has been introduced by Continental Manufacturing Co., Cincinnati, Ohio.

Incorporating Teflon sleeves, which require no lubrication, the valves give assured operation without seizing in any position. They are available in the 150-lb. class from ½-inch through 2-inch sizes, with both flanged ends and screwed ends.

The Tufline valves have internal ribbed construction to lock the sleeve in position while at the same time allowing for sleeve expansion and contraction without leakage, fully enclosed metal construction, no exposed Teflon, and four-bolted covers



for maximum protection against fire or line shock. Absence of lubrication prevents stream contamination, and the sleeve wiping action keeps the plug free of adhering solids and liquids.

These valves may be used to handle light gases and solvents to heavy slurries and corrosive liquids. They provide trouble-free service over the temperature range—150°F. to 400°F. and pressures from high vacuum to 275 p.s.i. (depending on temperature), add the manufacturers.

The new four- and five-port Tufline valves come with bodies and plugs of 316 stainless and Alloy 20, and carbon steel bodies with 304 stainless plugs. They can also be ordered in aluminum, bronze, Hastelloys, monel, nickel, and 304 stainless. All valves meet MSS-SP42 specifications; flanges and wall thicknesses meet or exceed ASA standards. Additional information can be obtained from Continental Manufacturing Co., 247 Park Ave., New York 17, N. Y.

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The completely bandless plug for *all* Jordans, the Jones Adapta-Plug is also the strongest, most adaptable, most economical plug ever made.

This revolutionary advance, exclusive with Jones, not only holds bars more securely, reduces slot wear and corrosion, but also cuts hours from the job of stripping and filling.

Before you replace another Jordan plug — ask your Jones representative about Adapta-Plug — or write us direct.

Jones FULBAR SHELL FILLINGS

Fulbar Shell Fillings eliminate keys and wedges. One piece construction fits shell body of any Jordan, simplifies handling, cuts installation time. And the patented No-wave pattern — also exclusive with Jones — has no sharp bar-ends to form strings or lumps.

For improved quality, more economical, trouble-free operation — make your next Jordan filling a FULBAR.

Rigid, one-piece FULBAR easily accommodates to inequalities in shell body of old, worn Jordans — is simpler to install, easier to grind in.

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Bleached Gw'd	$ 97.50/100.00	$ 97.50/100.00			
Kraft, Bichd.	157.00/ —	160.00/162.50	§157.00/162.50*		§157.50/ —
Kraft, Bichd. Hdwd.	152.00/ —		§137.00/ —		
Kraft, Semi-bleached.	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Bichd.	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulphite, Unbichd	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
Sulphite, Unb'l. Gl'an		140.00/ —	†134.00/ —		
Soda, Bichd.	147.00/150.00	150.00/ —			

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COTTON LINTERS

F.O.B. OIL MILLS
WEEK ENDED AUGUST 11

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	n.a.	7.50
3	$7.00/6.00	$7.50/7.00	6.75/6.50	7.00
4	6.00/5.25	6.25/5.75	6.25/5.25	6.50/6.25
5	5.25/4.75	5.25/4.75	4.75/4.50	5.75
6	4.75/3.50	4.50/4.25	4.00/3.25	3.90
7	3.50/2.50	4.00/3.00	3.00/2.75	3.00/2.50

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	Aug. 17	Aug. 17	Aug. 17	Aug. 17
No. 1 Mixed Paper	$ 10.00/ 12.00	12.00/ 14.00	9.00/ —	14.00/ 15.00
No. 1 News	14.00/ 15.00	15.00/ —	16.00/ —	18.00/ —
Overissue News (Lg. size)	13.00/ 15.00	12.00/ 14.00	23.00/ —	20.00/ —
Mill Wrappers	19.00/ 22.00	13.00/ 15.00	14.00/ —	15.00/ —
Old Corrugated Containers	24.00/ 25.00	23.50/ 24.00	23.00/ —	23.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	— / —	35.00/ —	55.00/ —
New Double Kr. Ld. Corr. Cuts	35.00/ 37.50	37.50/ —	37.50/ —	35.00/ —
(Semi-chem. medium)	47.50/ —	47.50/ —	45.00/ —	36.00/ —
New 100% Kraft Corr. Cuts	40.00/ 42.50	— / —	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	55.00/ —
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	52.50/ —	55.00/ —
New Br. Kr. Bag Waste Unprintd	60.00/ 65.00	65.00/ 75.00	60.00/ —	60.00/ —
No. 1 Groundwood Shvs.	25.00/ 30.00	25.00/ 30.00	24.00/ —	35.00/ —
White Newsblanks	65.00/ 70.00	53.50/ 60.00	45.00/ —	55.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	60.00/ 65.00	60.00/ —	70.00/ —
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	70.00/ —	— / —
Hd. White Shvs.	85.00/ 90.00	90.00/100.00	85.00/ —	95.00/ —
Hd. White Env. Cuts	100.00/105.00	105.00/110.00	90.00/ —	113.00/ —
Col. Tab. Cards	55.00/ 57.50	55.00/ 57.50	52.50/ —	40.00/ —
Manila Tab. Cards	77.50/ 80.00	77.50/ 80.00	75.00/ —	65.00/ 70.00
No. 1 Col. Ledger	40.00/ 45.00	37.50/ 42.50	47.50/ —	32.50/ 35.00
White Ledger	60.00/ 62.50	60.00/ 65.00	57.50/ —	55.00/ —
Mixed Book & Mag.†	25.00/ 28.00	— / —	17.00/ —	— / —
No. 1 Books‡	30.00/ 32.50	24.00/ 26.00	35.00/ —	17.00/ 24.00

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

PJT NEWS OF SUPPLIERS

Allis-Chalmers Industries Group has assigned James McInnis, Jr., as a sales representative to the Mobile district. Mr. McInnis is a mechanical engineering graduate of the University of Alabama and recently completed Allis-Chalmers training course for graduate engineers.

R. E. French

R. S. Miller

Planet Corp., Lansing, Mich., announces appointments to fill the newly created positions of general sales manager and assistant general sales manager.

The new general sales manager of the firm, which manufactures custom-designed materials handling systems and automation equipment, is Robert E. French. He was formerly the western sales manager. Robert S. Miller, Planet's former eastern sales manager, is the new assistant general sales manager.

Both men have been with Planet since 1946.

James Flett Organization, Inc., has named Harold M. Hansen president, effective September 1.

Mr. Hansen previously was associated with R. R. Donnelley and Sons Co., Chicago printing firm, where he served in several capacities such as general traffic manager and, more recently, manager of by-product sales. The Flett organization which he will head has headquarters in Chicago and offices in New York, Boston, Cleveland, Detroit and Los Angeles.

Dow Chemical Co. announces organizational changes designed for more effective handling of its expanding interests in coatings for the paper industry.

L. H. Silvernail has been promoted to group manager in the company's coatings technical service, in charge of four industry sections, including the paper section, which is concerned primarily with beater additives and coatings to facilitate printing and saturation. In active charge of the paper section is E. J. Heiser who was advanced from his former post as a customer service chemist working in the paper area.

Mr. Silvernail joined Dow in 1945, serving as a chemist in the Cellulose Products department until 1951 when he went with the CTS paint section. He has been head of the paper section since 1952.

Mr. Heiser has been with Dow since 1950 and his entire service has been devoted to coatings technical service with experience in the paper, paint and building products section.

Farrel-Birmingham Co., Inc., has moved the headquarters of industrial gear sales from its main office in Ansonia, Conn., to its gear manufacturing plant, 344 Vulcan St., Buffalo, N. Y.

Rudolph C. Wilson, who continues as manager, and Pierce Birkhoff, who has been appointed assistant manager, are both transferring to the new location. Richard T. Penhall and John Erker have also been assigned to the Buffalo sales office.

Joseph H. Allen, who has been appointed manager eastern area industrial gear sales, will remain at Ansonia and will be assisted by Frank Larkin.

Sandoz, Inc., New York, announces the transfer of Robert Welsh from a dyestuff sales assignment in the Philadelphia territory to Pacific Northwest area.

Mr. Welsh started with Sandoz as a trainee in 1948, after graduation from Cornell University. A veteran of World War II, he left Sandoz in 1950 for Korean service as a First Lieutenant in the U. S. Marines. He then joined the James Hunter Machine Co., selling textile machinery in the middle Atlantic states.

In 1958, Mr. Welsh returned to Sandoz as a dyestuff salesman reporting to the Philadelphia district office. He is a member of the American Association of Textile Colorists and Chemists.

Looking for a new position?

Looking for new personnel?

Keep your eye on our Classified Advertising Section

Robert Welsh

J. L. Sigler

Morden Machines Co., Portland, Ore., announces the appointment of John L. Sigler as director of sales and services.

Mr. Sigler, a native of Sharon, Pa., is a graduate electrical engineer from the Pennsylvania State University. In joining Morden, Mr. Sigler has resigned as manager of the Southern region for John W. Bolton and Sons, Inc., of Lawrence, Mass. He joined the Lawrence firm in 1954 as sales engineer selling and servicing stock preparation equipment in the New England region. Prior to that time, he was associated with The Minnesota Mining and Manufacturing Co., St. Paul, Minn. In his new assignment, Mr. Sigler will make his headquarters in Portland.

Arnold Hoffman & Co., Inc., manufacturer of organic chemicals, announces the appointment of Benny F. Howell to serve the paper trade in the Southeastern market. The appointment, according to management, is keyed to the company's expanding sales of defoamers and other specialties developed especially for pulp and paper making.

Mr. Howell's previous experience includes service as an industrial engineer with Plant Industrial Engineering, American Enka Corp., Enka, N. C.; as a technical assistant in technical supervision with American Enka's Viscose Staple plant at Lowland, Tenn.; and as a technician in the Chemical Research Laboratories

of North America Rayon Corp. at Elizabethton, Tenn.

A native of Elizabethton, Tenn., and currently a resident of Charlotte, N. C., Mr. Howell holds the degree of B.S. in Chemistry, having majored in chemistry at East Tennessee College and in chemical engineering at the University of Tennessee.

R. S. Field

Pfaudler Co., Rochester, N. Y., has appointed R. Stanley Field as market analyst. The Pfaudler Co., a division of Pfaudler Permutit Inc., is the world's largest manufacturer of industrial glassed-steel equipment and a major producer of alloy equipment for the process industries. In his new position Mr. Field will be responsible for determining the potential sales of existing and contemplated products as well as analyzing new and existing product lines to determine company status.

Before joining Pfaudler, Mr. Field was manager of sales research for Trans World Airlines. He has had extensive market research experience including more than four years as a senior consultant for Alderson Associates of Philadelphia, Pa. He was graduated from Amherst College and Harvard Business School.

Union Starch and Refining Co., Inc., and Union Sales Corp. announces the appointment of James P. Casey as director of starch sales. Mr. Casey will assume the responsibility for the sale of the company's line of starch products to consuming industries throughout the United States.

Mr. Casey attended Syracuse University from which he received both his B.S. and M.S. degrees in pulp and paper chemistry. Since graduation in 1937, Mr. Casey has been associated with the wet corn milling industry in technical and applied research capacities, with the exception of three years, during which he held the position of associate professor of pulp and paper chemistry at Syracuse University.

American Hoist & Derrick Co., St. Paul, Minn., has acquired the firm of Hetherington & Berner, pioneer Indianapolis manufacturer of stationary and portable asphalt plants and paving machinery. Donald R. Berner, Hetherington & Berner vice president, will become general manager of the new wholly owned subsidiary and both Indianapolis plants will continue to operate under the Hetherington & Berner name.

Since 1954 American Hoist has acquired Thomas Laughlin Co., Portland, Me.; American Steel Dredge Co., Fort Wayne, Ind.; Lebus Rotary Tool Works, Longview, Tex., and the Valley Iron Works, St. Paul Minn.; American Hoist Pacific Co., Seattle, Wash., another totally owned subsidiary, was organized in 1958, primarily to produce heavy specialized material handling machines.

Minneapolis-Honeywell Regulator Co. announces the appointment of sales managers for industrial branches in Pittsburgh, Pa., Albany, N. Y., and Columbus, Ohio.

Robert A. Wolfe, former branch industrial sales manager at Albany, becomes manager at Pittsburgh; Edward J. Reulbach, Jr., of the New York City branch office, heads operations in Albany, Joseph H. Toifel moves from Youngstown to Columbus.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	July 11	July 18	July 25	Aug. 1	Aug. 8
1959	71.3	89.9r	94.9r	93.5r	94.9
	July 12	July 19	July 26	Aug. 2	Aug. 9
1958	64.3	86.1	88.0	89.1	89.3

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1959	87.8	90.5	93.2	94.4‡	95.5‡	95.0‡	84.1‡	—	—	—	—	—	—
1958	86.9	89.5	89.5	88.4	87.2	87.2	75.3	89.6	86.5	91.6	90.4	83.1	87.1

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1952	1953	1954	1955	1956	1957	1958	1959
Year to Date	90.4	92.6	91.5	94.8	98.9	91.8	85.4	91.9
Year Average	88.6	92.3	91.6	94.0	97.9	90.9	87.1	—

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

	July 11	July 18	July 25	Aug. 1	Aug. 8
1959	56	84	94	98	98
	July 12	July 19	July 26	Aug. 2	Aug. 9
1958	48	83	93	93	92

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1959	86	93	95	93	96	96	83	—	—	—	—	—	—
1958	80	86	88	84	84	86	76	93	90	95	92	81	86

† *Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Aug. 8, 1959	LAST WEEK ENDING Aug. 1, 1959	CUMULATIVE TO DATE Jan. 1 to Aug. 8, 1959 incl.
% Activity	98%	98%	92%
TOTAL	336,991	331,482	9,481,389
Liner	113,579	116,657	3,261,351
Corrugating Material	52,837	51,699	1,444,209
Chip & Filler Board	5,031	4,891	159,255
Total Containerboard	171,447	173,247	4,864,995
Folding	61,971	59,348	1,728,530
Set-Up	13,132	13,459	356,561
Special Food Board	31,224	30,746	875,474
Other	59,217	54,682	1,655,829
Total Boxboard	165,544	158,235	4,616,394
Total Orders Received	366,851	351,802	
Unfilled End of Week	578,875	550,614	

Oakite HURRICLEAN® Gun

New steam-detergent gun packs a cleaning wallop

—yet it weighs in at only 6¼ lbs.

Here is a steam-detergent gun any child could handle – it's that light, that safe – but see what it does! Hitch it to your steam supply, aim it at your toughest cleaning job. Watch it slam into heavy pitch, scale, slime. It's almost like "wishing" the dirt away.

Steam-gunning with a hot detergent solution isn't new. What's new is a steam gun that's not heavy, not cumbersome, not dangerously hot.

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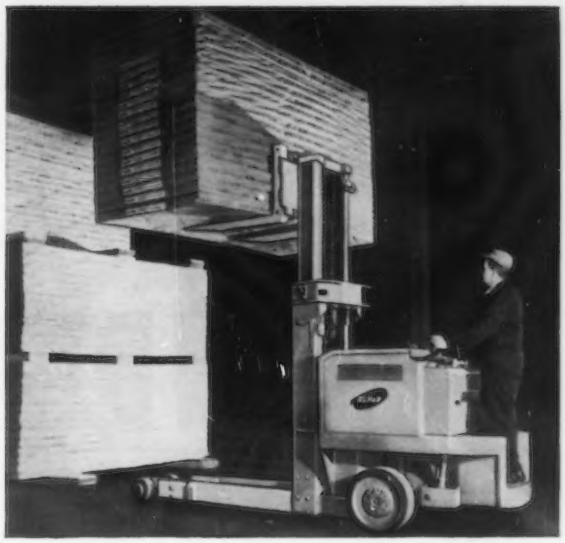

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PRACTICAL PAPER TECHNOLOGY

by William Bond Wheelwright

This book begins with a survey of "Progress in the Paper Industry" and ends with a list of books recommended for collateral reading. The intermediate chapters are entitled: "How to Judge Paper"; "Physical Aspects of Paper"; "Practical Manual and Visual Tests"; "Essential Facts About Papermaking"; "Coated, Glazed and Specialty Papers"; "Permanence of Paper"; "Paper Difficulties in Converting"; "Paper as a Medium for Printing"; "Letterpress Printing"; "Offset Lithography"; "Intaglio Processes."

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OPPORTUNITY AVAILABLE FOR CHEMIST IN FOLDING BOXBOARD MILL IN PENNA. QUALITY CONTROL EXPERIENCE HELPFUL BUT NOT ESSENTIAL. SEND RESUME OUTLINING EDUCATIONAL BACKGROUND AND EXPERIENCE. INDICATE REMUNERATION DESIRED. ADDRESS REPLIES BOX 59-244, C/O PAPER TRADE JOURNAL. A-24

Help Wanted

WANTED

MILL SALES REPRESENTATIVE to cover New York City, New England and South through Virginia. Must be experienced in selling and servicing of coated papers and willing to live in or near New York City. If available please mail us your resume. It will be treated in strict confidence.

CHARLES P. RAYMOND SERVICE, Inc.
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— SALES ENGINEER —

For Progressive, Growing Paper Mill Machinery Manufacturer

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We are looking for a man who has a minimum of five years of experience in our industry, a man who knows how to sell a company as well as a product; a man who will do so with conviction and enthusiasm because he feels a part of our dynamic, growing company.

Be prepared to work hard if you reply to this ad. This job is no picnic! It entails hard work, often with long hours—but future rewards will prove extremely gratifying. Patton's growth potential has been shown in the past. It has been built on extremely high standards. It also permits us to make this statement with confidence: Monetary considerations will prove to be no problem when the RIGHT man replies to this ad.

Let's summarize: "Order-takers" are a dime a dozen. We don't want any! If you are an experienced sales engineer in the paper mill machinery field and if you too have extremely high standards, then reply in confidence to

PATTON MANUFACTURING COMPANY, INC.
1803 West Pleasant Street, Springfield, Ohio A-24

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All inquiries held in strict confidence.

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Wanted for immediate sales and service engineering position leading to executive responsibilties.

Solid background in paper making is essential. Sales experience highly desirable. Salary dependent on experience and past achievements.

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Manager of Sales
Shartle Division
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Middletown, Ohio

S-7

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For responsible position in paper mill machinery sales.

Some background in production or sales is desirable but not essential. We will train.

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To supervise shift operation of two high-speed fourdrinier machines. Middle-Atlantic area; $12,000 annual income (salary and bonus). Write Gen. Supt., P. O. Box One, Richmond, Va.
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A-24

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1—86" Farrel 8-Roll Calender Stack. A. F. Bearings. Full set of Doctors.
1—8" Pusey & Jones 7-Roll Calender Stack.
1—30" Dia. x 130" Face Farrel Roll Grinder., Complete.
1—5' x 86" Pusey & Jones Yankee Dryer.
1—92" Langston Winder equipped with both score and shear cut slitter devices.
1—86" Warren Winder Complete. Recently rebuilt with new drums and new A. F. Bearings and Housings.
1—110" Pusey & Jones 2-Drum Winder. A.F. Bearings.
1—84" Kamyr Machine. 75 Ton per day.
10—48" x 150" Pusey & Jones Dryers.
7—36" & 72" Pusey & Jones Dryers.
1—E. D. Jones Majestic Jordon No. A-482. S.S. Fillings.
1—74" Seybold Trimmer & Cutter Z-12.
1—45" Seybold Trimmer & Cutter with 5 H.P. 220/440 Volt Motor. Rebuilt.
1—42" Dia. & 110" Face Pope Reel.
1—25" Dia. x 156" Perforated Face Sandusky Suction Couch. Complete.
1—22" Dia. x 138" Perforated Face Sandusky Suction Couch. Complete.
1—22" x 111" Vertical Size Press with Microrock and Rubber Rolls. A. F. Bearings with frame work. Pneumatically loaded.
1—24" x 102" Extractor Rolls. 20" Dia. Rubber Top Roll mounted with A. F. Bearings and Frame work. Spare Rolls.
1—22" x 96" First Press with Microrock Roll and Rubber Roll.
1—22" x 110" Press with Microrock Roll and Rubber Roll.
1—10-Knife Carthage Chipper with A. F. Bearings.
1—A.P.P. Rotary Centrifugal Pulp Screen, 40" Dia. x 42" Face, Serial #1274227.
1—#3A Bird Screen. S.S. Plates.
1—Hudson Sharpe Toilet Tissue Converting Machine. Serial #2123.
2—Packer 12-Plate Flat Screens. S.S. Bodies #.22 S.S. Plates. Less than 5 Years Old.
1—36" x 96" Saveall, Rubber Couch, S.S. Vat, A.F. Bearings.
1—Hummer Vibrating Screen.
1—Seybold Knife Grinder. Size G. 84" Table. Serial #4X802.
1—Sandy Hill Sulphur Burner. Complete.
1—54" Dia. x 48" Face Valley Iron Tub Beater.
1—53" Dia. x 66" Face Dilts 2000-lb. Iron Tub Beater with S.S. Hood.
16—Beater Rolls and Stands. Various Sizes.
5—Triplex and Duplex Pumps. Various Sizes.
1—DeZurick Consistency Regulator. Complete. One year old, never used.
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1—7½ H.P. G.E. Gear Motor, T.E.F.C. 220/440 Volts, 1738 RPM, 9.2 to 1 Ratio.
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1—128″ Downingtown 7 roll

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2—111″ face x 36″ dia; A-F Brng
1—132″ face x 42″ dia; A-F Brng
1—136″ face x 54″ dia; SS covering

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24″ Dia.: 38—46″ face; Chrome plated

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3—73″ face w/gears & bearings
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3—77″ face w/gears & bearings
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2—84″ face w/accessories
1—160″ face w/rope carriers

36″ Dia.:
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2—44″ face
2—46″ face
22—54″ face; complete section
4—70″ face w/gears & bearings
11—72″ face w/gears & bearings
1—74″ face Lukenweld w/A-F Brng
1—74″ face w/gears & bearings
3—75″ face w/gears & bearings
9—76″ face w/gears & bearings
1—77″ face w/gears & bearings
1—78″ face w/gears & bearings
2—80″ face
5—84″ face
3—88″ face
18—90″ face; complete section
1—138″ face
10—160″ face

42″ Dia.:
24—102″ Face; Complete Section
1—106″ face
1—110″ face
40—118″ face; complete section
1—120″ face
1—160″ face

48″ Dia.:
58—46″ face; chrome plated
1—52″ face w/gears & bearings
1—82″ face w/gears & bearings
5—90″ face w/gears & bearings
20—86″ face; complete section
10—100″ face w/bearings
24—110″ face w/frames & bearings
10—123″ face w/gears, frames & bearings
1—128″ face

DRIVES—ENCLOSED RIGHT ANGLE
1—Michigan 92½ h.p. ratio 10.1 to 1
1—50 h.p. Reliance VS with MG set & controls; 850-1200 r.p.m.
1—Beloit 65 h.p. Ratio 2.88 to 1
1—Phila. 28 h.p. Ratio 10.56 to 1
1—M&W 25 h.p. Ratio 6.326 to 1
2—B-C 25 h.p. Ratio 6.25 to 1

EMBOSSERS
1—80″ Hudson Sharp; A-F Brng
2—62″ Textile Machinery Co.; w/drives

FILTERS—STEEL VATS
1—6′ face x 3′ dia Dorr-Oliver
1—10′ face x 8′ dia Oliver chemical sludge filter
1—10′ face x 5′ dia. IMPCO—rubber lined

FLAT SCREENS
2—12 Plate IMPCO w/Dunbar Drives
1—4 plate Tailing Screen

INLETS & HEADBOXES
1—112″ Valley w/8″ distributing roll

JORDANS
2—Appleton #1 w/A-F Brng
1—N & W Pony w/75 h.p. motors

LABORATORY EQUIPMENT
1—24″ Waldron Coater & Embosser

MOTORS 3 PH 60 CYCLE
1—100 hp GE; 440 v; 695 rpm
2—100 hp GE; 440 v; 430 rpm
1—300 h.p. West.; 2200 v; 504 r.p.m.
1—350 hp GE; 2200 v; 720 rpm: Synch

PAPER MACHINE DRIVES
1—GE 65 hp shunt wound DC 75 hp AC motor, MG set & excitor
1—De Laval 100 h.p. steam turbine w/reducers

PULPERS
1—APMEW 12 ft. complete w/50 h.p. motor, junker, regulator & stock pump.
1—Dilts 16 ft. complete w/125 h.p. motor, elec. hoist & oil pump

PUMPS—OPEN IMPELLER END SUCTION
1—Shartle 8 x 16 Triplex
3—De Laval 1200 g.p.m. 25 ft. head
1—Economy 1000 g.p.m. 50 ft. head—vertical
1—Economy 600 g.p.m. 40 ft. head—vertical
1—Economy 400 g.p.m. 30 ft. head—vertical
1—Buffalo 2250 g.p.m. 43 ft. head
1—MDC 1500 g.p.m. 40 ft. head

REELS
1—36″ Kohler Automatic 2 arm unwind reel
1—100″ Kohler automatic two arm unwind reel; 60″ dia rolls; new condition
1—116″ Downingtown two bowl A/F Brngs.
1—123″ Beloit—2 bowl
1—150″ B & S pope type w/Reliance drive

REFINERS
1—#1 Dilts Hydrafiner
2—#1 Claflin; A-F Brng
1—24″ Downingtown Weiner; new
2—Shartle Miami Size R4 Cyclifiners w/150 h.p. motors

ROLL GRINDERS—COMPLETE W/MOTORS
1—208″ x 32″ Farrel w/crowning device

ROTARY SCREENS
10—Bird #3A. Model 100 w/SS or copper vats
1—Jones Leithwalk copper lined

SAVEALL
1—100″ face x 48″ dia. Shartle w/steel vat, A-F Brng & motor drive

SHEETERS—DOUBLE KNIFE
1—64″ Dillon
1—80″ B-C heavy duty board model
1—157″ Masson-Scott; like new

SHEETERS—SINGLE KNIFE
1—65″ Kidder w/elec. eye and layboy
1—71″ Hamblet
1—82″ Hamblet w/layboy
2—84″ Hamblet w/layboys and backstands
1—105″ Hamblet
1—110″ Hamblet w/layboy

SLITTERS & WINDERS
1—42″ Essex duplex; 30″ dia rewind
2—42″ Cameron Model 6; 24″ dia rewind
2—48″ Langston duplex; 24″ dia rewind
1—52″ Cameron Model 6; 24″ dia rewind
1—60″ Hudson-Sharp; plastic coated paper
1—60″ Langston; shear cut; 30″ dia rewind
1—60″ Kidder Model SH; 40″ rewind
1—62″ Cameron Model 8; 24″ dia rewind
1—62″ Cameron Model 6; 30″ dia rewind
1—62″ Cameron Model 8; 36″ dia rewind
1—70″ Center Winder w/variable speed motor
1—72″ Johnston; 36″ rewind; like new
1—72″ Cameron Model 26-3A duplex
1—72″ Beloit shear cut; 40″ dia rewind
1—72″ Hudson-Sharp high speed automatic
2—72″ Cameron Model 10
1—72″ Cameron Model 10, shear cut
1—82″ Langston Shear cut; 45″ dia rewind
1—86″ M & W 4 drum
1—86″ Cameron Model 8-10; 42″ dia rewind
1—92″ Cameron Model 28-3 duplex w/motor
1—110″ Cameron Model 18; 60″ dia rewind
1—124″ Cameron quick change slitter assembly
1—136″ Cameron Model 18; 60″ rewind
1—136″ Langston Type DA; A.F. Brng; 60″ dia rewind
1—148″ Langston shear cut; A-F Brng; 60″ dia rewind
1—194″ Cameron Model 19; A-F Brng

STOCK CLEANERS
2—1000 g.p.m. Shartle Hydrafuges w/motors
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SUPERCALENDERS
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1—65″ Norwood 8 roll; A-F Brng
1—92″ Norwood 7 roll w/drive

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Graduate Chemical Engineer for new engineering and development work. Job will require some travel to operating units in North America. Will be located in Southeastern U. S. A.

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A-31

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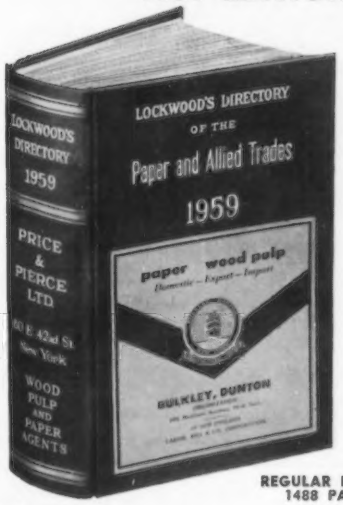

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BUSINESS STAFF

Arthur E. Gordon, Business Mgr.

Francis J. Gordon — Alrick Man

New York 36, N. Y. 49 W. 45th St. Plaza 7-2370
Cable: "Lockmin"

CHICAGO 3, ILL.: H. K. Vinton
Room 1020, 79 W. Monroe St. CEntral 6-2784

PITTSBURGH 11, PA.: H. L. Poulton
610 Pennridge Road. HEmlock 1-1571

MIAMI 38, FLA.: Hal Moore
279 N. E. 79th Street. PLaza 8-5516

Rep. by McDonald-Thompson in:

LOS ANGELES 5, CAL.: R. Teeter
3727 W. Sixth St., DUnkirk 7-5391

SAN FRANCISCO, CAL.: Cal Wood
625 Market St. YUkon 6-0647

DENVER 3, COLO.: Bob Heidersbach
620 Sherman Street. KEystone 4-4669

PORTLAND 4, ORE.: Fred Goetz
404 Times Bldg. CA 2-5146

DALLAS 19, TEXAS — Parker Harris
2727 Oak Lawn Ave., LAkeside 1-1266

HOUSTON 6, TEXAS: F. Vickrey
Room 214, 3217 Montrose Blvd. JAckson 9-6711

SEATTLE 4, WASH.: H. Abney
1008 Western Ave. MA 3-3766

Frederick B. Grosse, Production Mgr.

New York 36, N. Y. 49 W. 45th St. Plaza 7-2370
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Stafford House, Norfolk St., Strand, London, W.C.2

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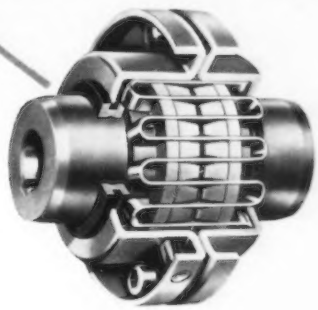

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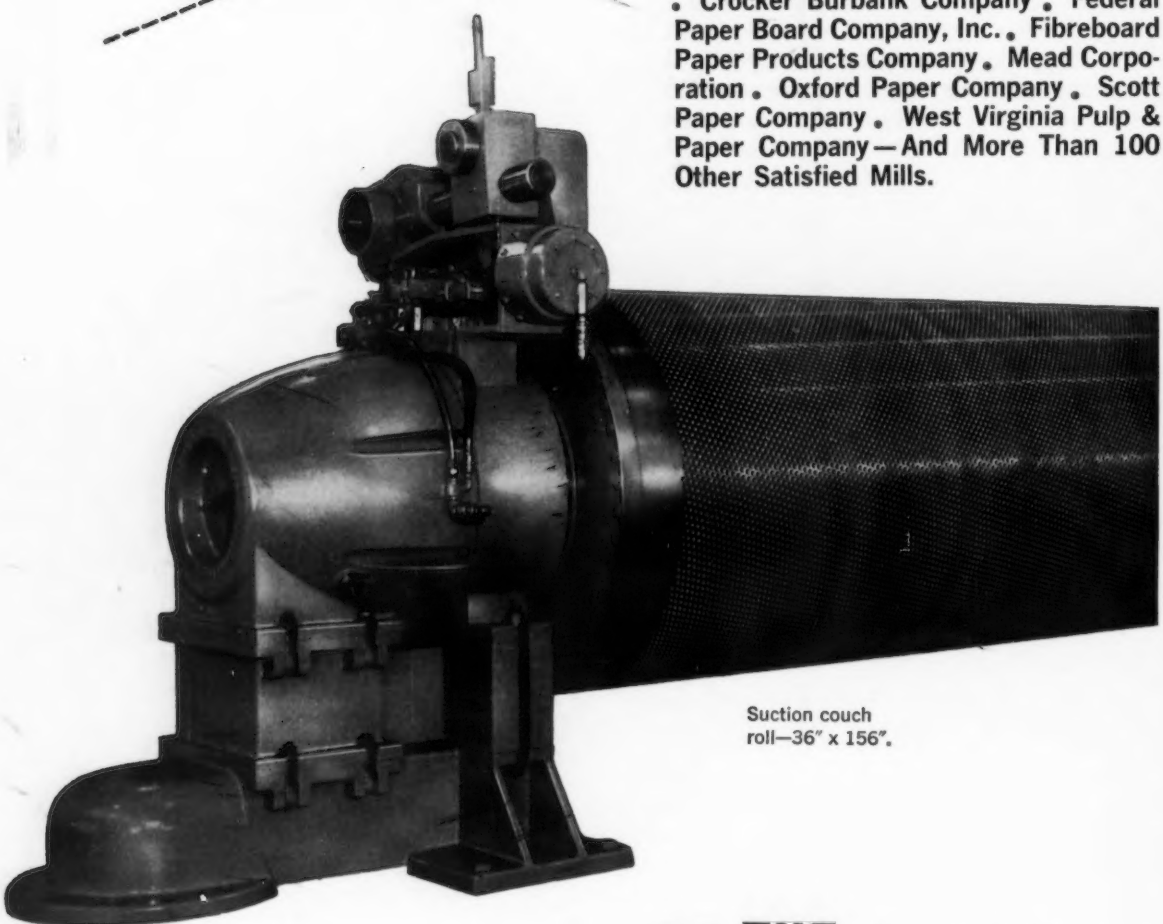

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